RAILROAD GAZETTE

FRIDAY, JUNE 2, 1899.

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Contributions.

The M. C B. Coupler.

Chicago, Milwaukee & St. Paul Railway Co.,
West Milwaukee, May 20, 1899.

To the Editor of the Railroad Gazette:

I have read the article on "Service Results of M. C. B. Couplers" [see Railroad Gazette, May 5, p. 314] and I consider it one of the best contributions to the coupler question that has been made in a long time.

All the replies show that, if the couplers are in good condition, the M. C. B. coupler is superior in every respect to the others. They also show that couplers are not kept in good condition and that many couplers are never in such shape as to operate well, while others are not maintained in this condition, and under such circumstances the M. C. B. coupler is worse than the link-and-pin.

Many couplers seem to be designed simply with the point of view of getting up something to sell without consideration of the requirements. I am satisfied, however, that this class of couplers will be gradually retired from service. This has already been the case with many. The final result will be a coupler in which the locking device will not uncouple either by shocks or creeping, such result being obtained without any multiplication of parts, and one also in which a moderate force applied will unlock the coupler.

The yard is the place now in which the requirements of a coupler can be learned better than in any other service. There are at the present time a number of couplers which meet the requirements of road service satisfactorily in every respect, but I do not know of any coupler to-day that fully meets the requirements of yard service.

J. N. BARR,
Supt of Motive Power.

The Atlantic Type Locomotives of the Wabash.

The Wabash Railroad Company.
St. Louis, Mo., May 25, 1899

To the Editor of the Railroad Gazette:

In your issue of May 5 you have an article under the heading "The New Passenger Engines of the Burlington," in which you refer to these engines as being the largest engines for heavy fast passenger service so far built.

In 1898 the Wabash Railroad received five Atlantic type passenger engines from the Baldwin Company, built on Wabash specifications, the general weights and dimensions of which are as follows:

Cylinders	19 x 26
Driving wheels	73 in. in diam.
Weight on driving wheels	91,935 lbs.
Weight on front truck	33,250 lbs.
Weight on trailing wheel	34,400 lbs.
Total weight of engine	159,585 lbs.
Boiler pressure	210 lbs.
Heating surface, firebox	199.9 sq. ft.
Heating surface, tubes	2,223.0 sq. ft.
Total heating surface	2,423.0 sq. ft.

By comparing these figures with the C. B. & Q. Atlantic type No. 1,591 you will note that the total weight of the Wabash engine is 535 pounds greater than the Burlington engine and that the weight on driving wheels is 6,085 pounds greater. The driving wheels of the Wabash engine are 73 inches, or 11¼ inches less than the Burlington drivers.

These Wabash engines are hauling regularly an eight-car train, consisting of two sleepers, one parlor car, two chair cars, one café car, one coach and one baggage car, between St. Louis and Decatur. This is up hill, with several grades of 49 feet to the mile. The running time of this train from Granite City to Decatur, 104.8 miles, is two hours and eight minutes, including two stops, one of which is for water. These engines have a record on the Wabash of 91.5 miles an hour with a four-car train, and of 75 miles an hour for a 36 mile stretch with the same number of cars.

The distribution of the weight on drivers was changed after we had the engines in service for a while, and the weight on drivers was reduced to about 86,000 pounds. The weight on trailing wheel and front truck was increased to that extent. I think you will have to still give the Wabash the credit for having the heaviest passenger engines for high speed purposes.

A. B. C.

[These Wabash locomotives were described with illustrations in the Railroad Gazette, April 1, 1898, p. 232. The weights then given were: On drivers, 83,000 lbs.; front truck, 30,000 lbs.; trailing truck, 24,000 lbs.; total 137,000 lbs.—Editor Railroad Gazette.]

Steel-Tired or Chilled Wheels.

Pennsylvania Car Wheel Company,
Pittsburgh, May 24, 1899.

To the Editor of the Railroad Gazette:

We have noted with much interest the discussion on the subject of steel wheels versus chilled wheels in recent issues of your valuable paper. One manufacturer seems content to rest upon the proposition that the "best makes of steel-tired wheels are safer than chilled wheels," while another on the opposite side of the question summarizes his position by being prepared to present facts at a more favorable opportunity.

Why not get down to actual demonstration at once? Everyone familiar with the subject knows that steel wheels or steel-tired wheels are made all the way from 100 lbs. up to 500 lbs. heavier than the chilled wheel. They also know that the consumer pays anywhere from $35 to $65 for the steel wheel and has paid less than $10 for years for the chilled wheel, and they know further, that the steel wheel when worn out has practically no value, while the chilled wheel as scrap always bring fifty per cent. of its original cost.

To make this matter of greater interest and of probable benefit to the trade in general, which we believe is the object your paper has in allowing the subject to be discussed in its columns, we make the following proposition:

We will agree to supply any number of wheels from one set (of eight) up to five sets (of forty) wheels to be tested in competition with an equal number of steel wheels. The trial to be conducted by a committee of three or five competent men as may be hereafter arranged. A price to be quoted at which we agree to supply, if desired, not less than five hundred wheels precisely like those used in the test; the manufacturer of steel wheels to do the same. A careful record to be kept of mileage and of costs, based upon the quantity price as above. The mileage, condition of wheels at the end of trial and comparative cost after complete results have been ascertained, including allowance for the market value of the scrap wheel at the end of the competition, to count as points in the test; any other details of test to be arranged after selection of committee. Both parties to present the test wheels gratis to the road making the trial; the loser to present an amount equal to the invoice value of his wheels to some well-known charity.

The foregoing, we believe, would be an "actual demonstration" of value to every purchasing agent or railroad and convincing in itself.

CHARLES V. SLOCUM.
Secretary and Treasurer.

The Railroads of the World in 1893 and 1897.

In the May-June issue of the Archiv für Eisenbahnwesen appears the annual table published by that journal of statistics of the railroads of the world. This covers the length of railroad in various countries and grand divisions for each of the five years, 1893 to 1897, inclusive. It gives also the increase from 1893 to 1897 absolutely and by percentages and the amount of railroad in each of the countries per 100 square kilometers and per 10,000 inhabitants. Below we have selected certain columns from these extensive tables and converted the metric units into English units. The conversion is, perhaps, subject to some correction, but has been made with great care.

According to these figures the total length of railroad in the world in 1897 amounted to 732,255 kilometers (454,730 miles) and the increase from 1893 to 1897 was 60,362 kilometers (37,485 miles), or 8.9 per cent. America, including North and South America and the West India Islands, has something more than half of the total mileage, or 380,384 kilometers (236,218 miles). The precentage of increase in the years considered was only 5.4, the average having been pulled down by the falling off in construction in the United States. Of single nations, of course, the United States has much the largest quantity of railroad, namely, 296,745 kilometers (184,278 miles). The increase from 1893 to 1897 amounted to only 3.6 per cent., or 10,562 kilometers (6,559 miles). Next among the great nations comes the German Empire with 48,116 kilometers (29,880 miles), and after this come in the following order: Russia, France, Great Britain and Ireland, British India, Austria-Hungary, British North America, Italy and the Argentine Republic.

In amount of railroad as compared with the area, Belgium has the most, namely, 20 kilometers for each 100 square kilometers (32.2 miles for each square mile) of area. The Kingdom of Saxony comes close to this with 18.3 kilometers (11.3 miles). In the supply of railroads relatively to the population the thinly settled countries naturally show the greatest quantity, and in this respect the colony of South Australia stands first with 84.3 kilometers (52.3 miles) for each 10,000 people; Queensland has 83.7 (51.9 miles), and all of Australia 51.9 (32.2 miles), while Belgium which is so rich in railroads as compared with the area of the country, has but 9.1 kilometers (5.65 miles) for each 10,000 people.

RAILROADS OF THE WORLD, 1893 TO 1897.

Country.	Length of railroad, miles.	Per ct. increase 1893 to 1897.	Miles per 100 sq. miles.	Miles per 10,000 of population
All of Germany	29,880	7.3	14.32	5.71
Austria-Hungary (including Bosnia, etc.)	20,908	15.4	8.05	4.60
Great Britain and Ireland	21,590	3 6	17 55	5.28
France	25,673	5.0	12.56	6.71
Russia (including Finland)	25,003	20.2	1 13	2.36
Italy	9,714	10 1	8 85	3 11
Belgium	3,667	7.8	32.20	5.65
Netherlands (including Luxemburg	1.913	1.0	14.17	3.79
Switzerland	2,264	6.9	14.17	7.45
Spain	8,021	13.0	4.03	4.41
Portugal	1,464	9.7	4.03	2.86
Denmark	1,579	15.8	10.47	6.89
Norway	1,204	20.4	0 97	5.71
Sweden	6,315	15.7	3.76	12.73
Servia	354	5.5	1.93	1.55
Roumania	1,789	14.8	2.74	2.92
Greece	591	4.0	2 25	2.36
European Turkey, Bulgaria and Roumelia	1,586	40.8	1.45	1.68
Malta, Jersey, Man	68		16 10	2.11
Total, Europe	163,413	10.3	4.35	4.28
United States	184,278	3.6	6.12	26.21
British North America	16,684	8.1	0.48	32.17
Newfoundland	566	87.2	1 29	26 89
Mexico	7,384	7.5	0.81	5.84
Central America (Guatamala, Honduras, Nicaragua and Costa Rica)	644	3.8	0.32	2.67
Total, North America	209,556			
United States of Colombia	346	34.1		0.75
Cuba	1,104	2.8	2.58	6.76
Venezuela	633	7.7	0 16	2.55
San Domingo	117	46.0	0 48	2.30
Brazil	8,657	16.1	0.46	5.09
Argentine	9,422	12.8	0.81	20 80
Paraguay	157		0.16	3.11
Uruguay	1,118		1.61	13.41
Chile	2,662	38.2	0.81	8 32
Peru	1,035		0 16	3 42
Bolivia	621	4.7		2.55
Ecuador	186			0.50
British Guiana	22			0.81
Jamaica, Barbadoes, Trinidad, Martinique, Po to Rico, Salvador	582	32.4		
Total South America and West Indies	26,662			
British India	21,002	14.2	0,97	0.68
Ceylon	297	55.6	1.13	0.87
Asia Minor and Syria	1,358	49.5	0.16	0.99
Russia (Transcaspian Dist.)	939	5.7	0.32	13.41
Siberia	2,360			4.04
Persia	34			
Dutch India	1,293	11.5	0.48	0.44
Japan	2,504	24.5	1.45	0 56
Portuguese India	51		3.54	0.99
Malay States (Borneo, Celebes, etc.)	161	85.0	0.48	2 24
China	299	141.0		
Siam	167			
Cochin China, Pondicherry, Malacca and Tonquin	238	46.9		
Total, Asia	30,903			
Egypt	1,754	63.8	0.32	1.80
Algiers and Tunis	2,704	33.1	0.64	4 28
Cape Colony	2,257		0.64	12.85
Natal	459	16.0	1 61	5.84
South African Republic	709	66.4	0.48	8.14
Orange Free State	832	34.0	1 61	39 52
Mauritius, Reunion, Senegal, Angola, Mozambique, Kongo	1,189	59.5		
Total, Africa	9,904	28.7		
Australasia	14,292	8.5	0.48	32.23
Recapitulation:				
Europe	163,413	10.3	4.35	4 28
North America	209,556	5.4		
South America	26,662			
Asia	30,903	27.6		
Africa	9,904	28.7		
Australasia	14,292	8.5	0.48	32.23
Total	454,730	8.9		
Per cent. increase over 1896	2.2			

Other tables in the Archiv give the increase of the world's railroads by grand divisions for each period of four years, beginning wth 1879, also the same data for each of the great nations. Other tables give the capitalization of the railroads in gross and per kilometer.

The American and Foreign Iron Trades—1898.

The annual statistical report of the American Iron and Steel Association, prepared by Mr. James M. Swank, General Manager of that Asociation, was issued to the members May 15. It is the well-known yellow pamphlet, this time of 76 pages, and it is divided into statistics of the American iron trade, the Canadian iron trade and the foreign iron trade. It is prefaced with a few pages giving the names and a few particulars of men connected with the iron and steel trades who died between August, 1898 and May, 1899.

Mr. Swank says that prices began to advance in December, 1898, and continued to advance steadily until the early part of February. Then excited markets came which lasted until the latter part of March, when prices became stationary. Until the December advance Bessemer pig at Pittsburgh ranged from $9.75 to $10.50, billets from $14.75 to $16, and steel rails, at Pensylvania mills, from $17 to $18. In March, the prices were: Bessemer pig about $15.65, billets $25.50 and steel rails $26.

In 1898, we made more pig iron than in any other year, also more Bessemer steel and more open hearth steel, and we rolled more rails than in any other year, except 1887. The total product of pig iron amounted to 11,774,000 gross tons; in 1897 it had been 9,653,000. Of a few other items the production in 1898 and 1897 respectively was: Bessemer steel ingots and castings, 6,609,000 tons and 5,475,000 tons. Open hearth ingots and castings, 2,230,000 tons and 1,609,000 tons. All steel, 8,933,000 tons and 7,157,000 tons. Bessemer rails, 1,977,000 tons, and 1,645,000 tons. All rolled iron and steel, including rails, 8,513,000 tons and 7,002,000 tons. Iron and steel wire nails, 7,418,000 tons and 8,997,000 tons.

Our exports of iron and steel and manufactures of iron and steel aggregated in value $82,771,550 in 1898, against $62,737,250 in 1897, and $48,670,218 in 1896. In 1898 we exported 253,057 tons of pig iron and 291,038 tons of steel rails. Our exports of pig iron were less by about 7,000 tons than in 1897. Our exports of steel rails were greater by 148,000 tons.

The Morison Lift Bridge Over the Chicago River.

On the west fork of the south branch of the Chicago River, on the road worked by the Chicago Terminal Transfer Co., a special design of bascule bridge has been built. The design is by Mr. George S. Morison, Past President Am. Soc. C. E., and has some novel features, the chief differences between this and other bascule bridges being in the driving machinery and the method of counterweighting.

The bridge has three spans, two of which are intended for plate girder lifting draws, but the tower and lifting machinery have been provided at one end only. The bridge is immediately below a pivot draw and the two piers and intermediate girder correspond to the space occupied by the pivot pier of that bridge. Although the authorities insisted that there should be two openings in the bridge, machinery was installed for but one of the two lifts, the other opening will probably never be needed.

This is a four-track bridge, having 16 girders 70 ft. long and eight girders 27 ft. in length. The estimated weight of the part that is lifted is 350 tons. Each counterweight weighs 53,500 lbs., and the part that is moved is under-counterweighted in the lower and over-counterweighted in the upper position, thus requiring power to start it from either position. If he were to build another bridge of similar design Mr. Morison would change the plan so that it would be under-counterweighted throughout.

Fig. 1 is a general view from a photograph, some of the details of which are shown in the accompanying line drawings. The machinery is on a platform, as shown in the half tone, and the driving mechanism is shown in Fig. 2.

The bridge is in two parts, each of which can be operated separately, the four girders under each pair of trucks terminating in a cross girder, to the ends of which the chains and ropes are attached. Two ropes and one chain run from each end, over a six-foot sheave on top of the tower, to the counterweight on the other side. The greater part of the weight is carried by the ropes, the chain simply taking up the difference, which varies with the position of the girders. The object in using the chain is to get a hold on the sheave which will not slip. The sheaves are keyed to shafts and the bridge is raised and lowered by turning these shafts. These shafts are turned through another sheave over which the driving chain passes, this driving chain being driven from a shaft running parallel to the axis of the bridge, the position of which is shown on Fig. 2. There are two shafts by which the driving chains are driven, each being connected with the engine by an independent friction clutch, so that the shafts can be worked either separately or together, and the whole bridge or one-half can be raised and lowered at a time.

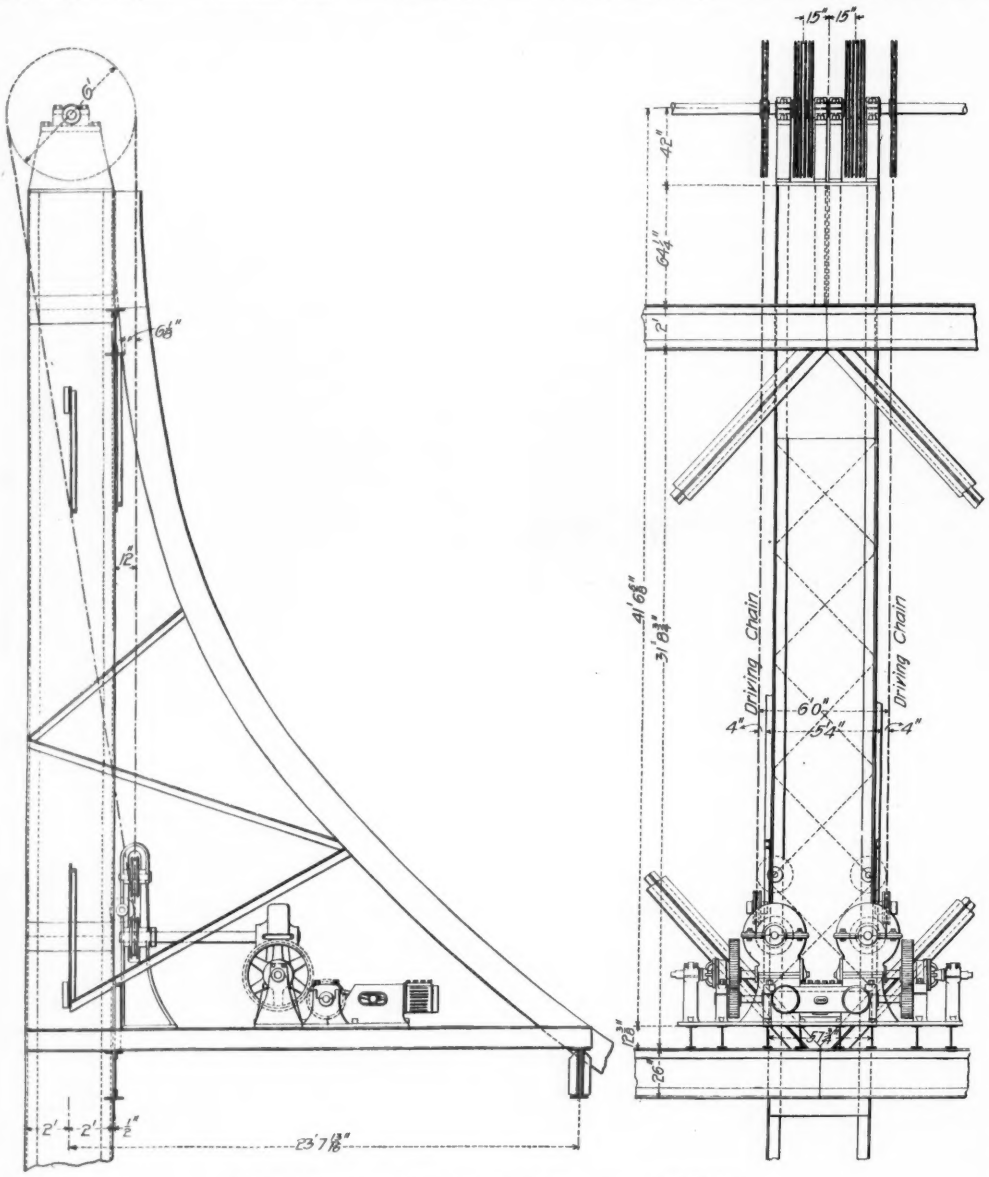


Fig 2.—Power Machinery to Operate the Morison Lift Bridge.

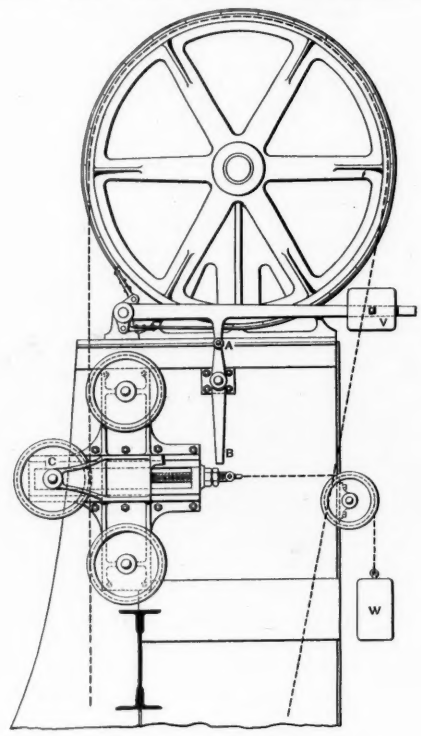


Fig. 3.—Safety Friction Brake and Idler.

The friction brake and idler shown in Fig. 3 was designed especially for this bridge. When working under usual conditions the weight W draws the wheels against the cable and takes up any slack due to the irregular motion or uneven pull on the driving ropes. In case the chain breaks, the frame containing the three wheels will be drawn quickly to the right, and the lever marked B moved so as to permit the lever which rests on the support at A to drop, and the weight V will apply the brake on the wheel. In Figs. 4 and 5 are shown the hinges and the bearings, and in Fig. 6 the stress sheets.

The positions of the weights and lifts in three positions are shown in Fig. 7, where is also indicated the method of attaching the lifting ropes to the main girders. The track on which the weights run is in the form of an elipse. When the lift is lowered, oak blocks, indicated in this drawing, lift the swinging portion from the hinges, thus relieving any strain which would otherwise come at these points. The hinges shown in Fig. 4 may indicate how this is possible. The pinhole is 3 in.x4 in., so that when in the lower position there is an inch to allow for the raising of the bridge at this point.

Mr. Morison states that the design of the machinery would be modified if plans were made for another similar bridge, the principal change, besides modifying the curve so that the bridge would always be under-counterweighted, as previously noted, would be to raise and lower it by a winding engine.

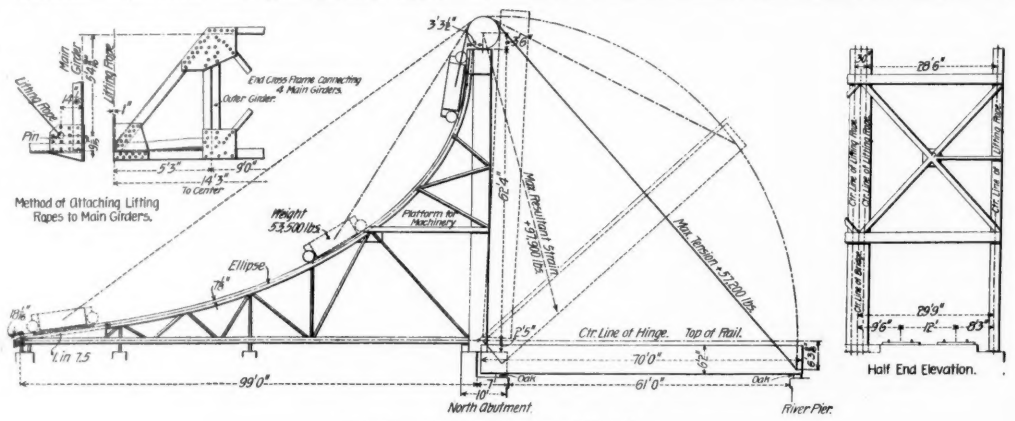


Fig. 7.—Some Details of a Lift Bridge.

Construction and Reconstruction of Telegraph Lines.*

By C. H. Bristol.

In the evolution of the telegraph line progress has been slow but sure. We have passed from a 3-in. sapling pole in 1846 to a 9-in. cedar in 1899. The pioneers learned by experience the truth of the old maxim that "Whatever is worth doing is worth do-

*Paper read before the Association of Railway Telegraph Superintendents at Wilmington, N. C., May 17. Condensed.

i g well." In the construction of the first lines every dollar spent was lost. The original stockholders realized nothing from their investment, and many of them gave their stock away to avoid assessments. The timber used was unsafe after three years, and by the time some of the lines between the larger cities were completed the first poles set had commenced breaking off. The wires were unreliable and it was the exception for them to be in working order.

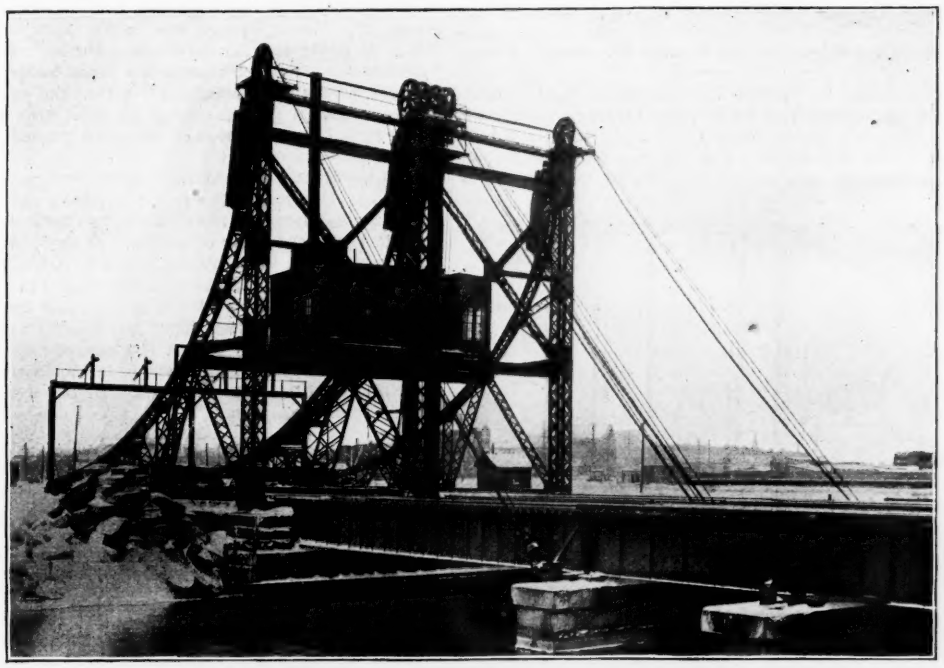


Fig. 1.—Bascule Lift Bridge Over the Chicago River—Designed by Mr. George S. Morison.

The style of construction has changed greatly within 20 or 25 years. In the early days a man of ordinary strength could pick up a 25-ft. white cedar pole, and with the assistance of one man could throw it into the hole easily; but with the trunk line of to-day it requires six to ten men to erect poles. Each hole must be not less than 4 in. larger in diameter than the pole to give room to use tampers properly in setting. The distributing of light poles was an easy task, being generally handled by two men; but the work now requires five men on a car; the poles must be passed from the car with ropes to avoid breakage. The men all ride directly on top of the load, and the poles are handled altogether by the use of cant hooks and peaveys. The rope has made a great saving in breakage. In a recent instance, in distributing 500 miles of heavy poles, 30-ft. and longer, only 36 poles were broken in the entire distance. The handling of poles by men on top of the loads, instead of riding on ends of poles, or on ends of cars, makes it much safer for the men, and the use of peaveys still further reduces the danger. In early days poles were distributed by guess. At present the circumference of the driving wheels is measured, and the revolutions counted by a man stationed on the pilot, who makes a long mark with an iron rod in the ballast at the side of the track, and the pole is dropped off at that spot. Thus poles do not have to be carried when setting is done. This is quite an item of saving, particulary if the poles are wet.

The approximate weight of cedar poles is as follows:

7	inch	25	foot	poles	weigh..... 335 lbs.
8	"	25	"	"	" .... 430 "
7	"	30	"	"	" ... . 475 "
8	"	30	"	"	" .... 644 "
9	"	30	"	"	" .... 690 "
7	"	35	"	"	" .... 720 "
8	"	35	"	"	" ..... 936 "
9	"	35	"	"	" ... . 1,020 "

On arms carrying six or more wires braces are a decided advantage. The long arms, if not braced, will get out of shape after a short time. The shrinkage of the arm will be greater than in the gain, and the arm becomes loose. When wires are loaded heavily with sleet we have much less damage by broken arms when they are braced than when they are not. Braces also enable us to use a shallow gain. A deep gain destroys much of the strength of the pole.

The front or the face of the arm opposite the pole is the place to attach braces. A brace on the front of an arm helps to hold the arm in the gain when wires are loaded with sleet.

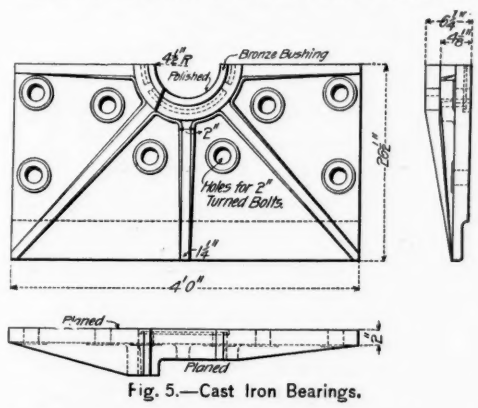


Fig. 5.—Cast Iron Bearings.

Double arms should be used at all railroad and river crossings, and on corners, and on unusually long sections. On heavy lines the first pole back from a corner pole should be double armed to carry bridle guys for strengthening corner or crossing pole guys; with double arms only one of the two should be braced, and this should be the front or lead set. The plan of facing poles alternately in opposite directions has proved very beneficial in sleet or other storms, which often wreck a line. It prevents pulling many arms from the poles. I have seen cases where the arms for a full mile have been pulled from old poles where they were all faced in one direction.

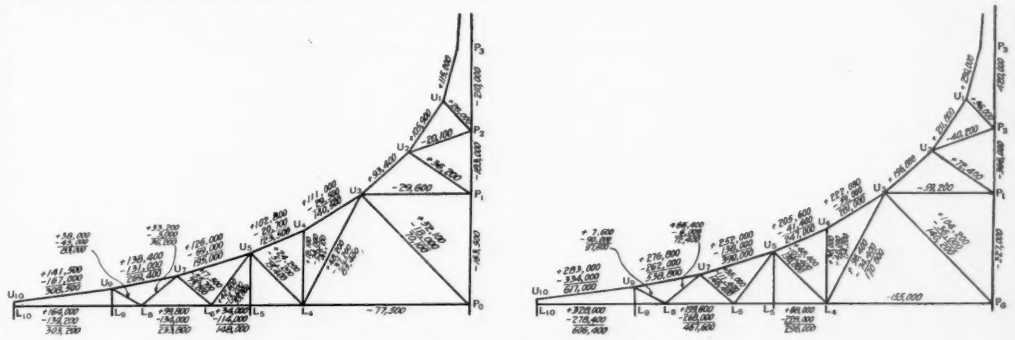


Fig. 6.—Stress Diagrams for a Lift Bridge.

Poles set in gravel or quicksand should always be pointed to make them stand well. When not pointed the wind will vibrate the pole more or less and the loose gravel or quicksand will keep working under the bottom of the pole and thus gradually lift it and render it less secure each year. I have seen cases where unpointed poles set in barrels in quicksand were, by the action of the wind, lifted, and the barrel brought to the top of the ground in a few years; and when the poles were dug around and examined it was found that they were not as deep as originally set by from 1 to 2 ft. Poles set in swamps or low wet places and on straight lines should be braced alternately from each side with braces of uniform length and set at exactly the same angle. Poles set on curves should be braced on one side, but with end and center poles anchored. A timber anchor 3 in. by 16 in. by 16 in., buried 5 ft. deep, will, if properly tamped in, hold a heavy corner. Two anchors of this class will stand as much strain as the old 4-ft. anchor made of pieces of pole in J, shape, and are cheaper to renew. In quicksand the expense of cribbing for the old style was heavy; with the present style we can, by using two sand barrels, set two anchors for less than one-third the cost of the old style, as cribbing is unnecessary.

Dynamite in small charges has been used to great advantage in moving "hard-pan" and frozen earth, and is much cheaper than digging it with bar and spoon. With a 2-in. auger bit with a 4-ft. stem and a suitable handle, bore a hole to the proper depth, say 3ft., then use ¼ lb. 40 or 60 per cent. dynamite. To dig holes in fair earth or in wet places, use 14-in. post augers. For quicksand or live gravel the iron two-piece sand barrel is the only reliable way to insure setting poles the proper depth.

In reconstruction set all poles and anchors before handling the wires, if it can be done. This gives the poles time to become settled before climbing them and also insures the presence of your foreman with all of his men. If his party is divided, part setting poles and others handling wires, the responsibility for wire trouble cannot be fixed. Poles should be located so as to give room enough between them and the fence to carry a reel.

To reset poles with a number of wires on them use an 8 or 10-in. roller (made of a piece of old pole), a chain of ½-in. or ⅝-in. round links and a couple of pulling bars. The chain is passed around the pole with slide or choke fastening, then around the roller the same as a capstan; then with the bars (inserted in holes in roller) turn the roller, with one man holding slack in the chain as it comes to him. In this way a large pole can be lifted with very little digging around it. This is also a good plan when resetting a line of poles, as all old stumps can be pulled and the hole thus utilized at much less expense than digging a new hole. The roller should lie close to the pole or stump. It is cleared of the ground by two old arms or any suitable pieces of timber. Where a pole is to be moved some distance and cannot be trenched, it can be pulled to the top of the ground by the roller and then placed on a board and slid to the proposed location and lowered into the new hole without any difficulty, and at much less expense than by taking it down.

The handling of wires on reconstruction has been improved in late years. It is not now considered necessary to restring or pull the slack out of all wires when transferred from old to new poles. There is no advantage in tight wires. Since we stopped pulling them tight we have had many less breaks and certainly very many less joints. The expense of handling wires on reconstruction has been reduced one-half. On our reconstruction now all joints in iron wire are made by using a third piece of wire; this third piece adds much strength to the joint and often prevents breaks caused by soldering. It should extend out on the main wire at each end of the joint at least two turns beyond the main wire.

Copper wires are jointed by the use of long McIntyre sleeves. Exactly three turns of the connecting wrench on a sleeve makes the joint properly. The soldering of joints on iron wire does not receive the attention it should. The dip pot and pouring ladle makes the best joint. Copper and iron wires should never lie together in the same groove of glass, but should be attached to double grooved or end on separate glasses, and the point of contact between them should be thoroughly soldered.

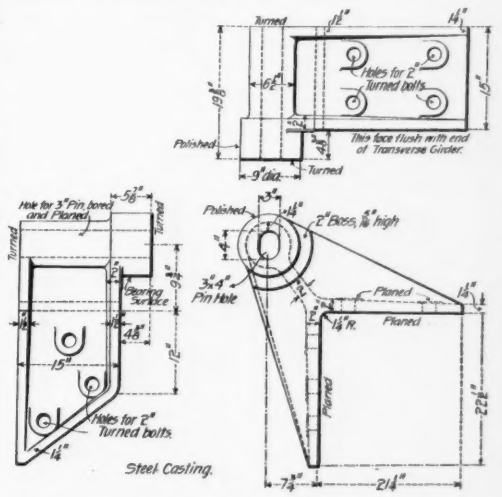


Fig. 4.—Cast Steel Hinges.

Cables should be retaped when the outside cover begins to disintegrate or fray out. The spinning of cables holds them up in much better position than the old plan of hooking them to carrier wires; the marline when worn out can be easily removed and cable respun by men working on the poles without

the use of ladders, which were necessary when hooks were used. Cables are now put up by the use of snatch blocks much quicker and cheaper than when we used hooks and had to slide the cable along on carrier wires and pass every hook around each pole fastening of carrier wire. Wires, both iron and copper, are now tied with steel tie wrenches instead of pliers and are much better tied. Guy wires should be fastened with clamps; then they can be quickly removed when necessary.

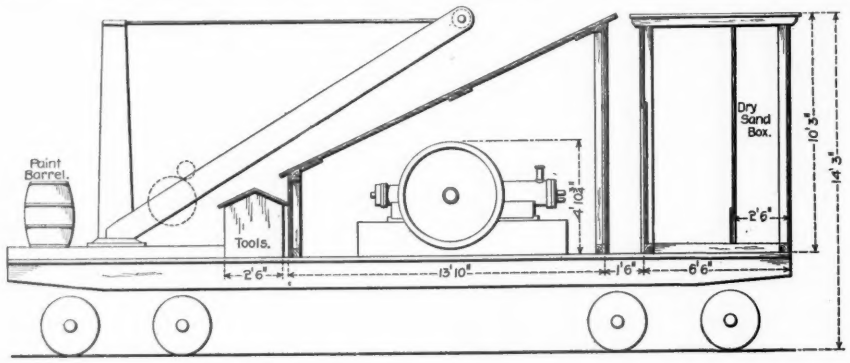
When right of way permits, it is a good plan to locate a new line 10 ft. away from the old line. This facilitates the work and gives sufficient room to avoid a great amount of wire trouble. Where right of way is narrow and two lines of poles must necessarily stand close together, and often cross each other, it is better in reconstruction to use cable temporarily and cut the wires "dead." They can be handled enough faster to offset the labor of handling the cable. In many instances it is impracticable to handle wires and operate them at the same time.

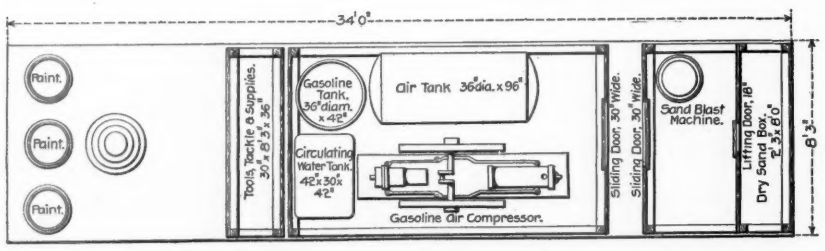
On straight lines wires should be tied on the inside of glass, and on curves should be tied so that they will pull against the glass instead of the wire. Ends of tie wire should be bent in with ends pointing towards the groove in the glass. Gage tags should be removed from new wire before it is strung. On reconstruction work all pieces of old tie wires should be removed from the line wire. Poles should be banked up sufficiently to shed water, and where possible surrounded with gravel or stone ballast at surface of ground to prevent damage by fire. All iron fixtures should be painted.

Aerial cables should be connected up with reference to the tracer, beginning with the tracer on the inside of the cable. With connections at offices go to the right; on poles go to the left.

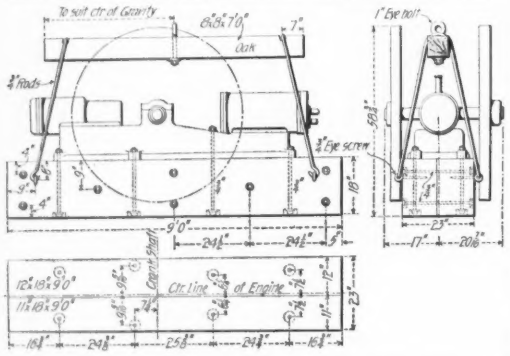
A Portable Air Compressor.

With the spread of the use of compressed air by railroads there are many calls for convenient schemes for carying compressors about a railroad system. The engravings show the arangements prepared in the office of the Chief Engineer of the New York Central & Hudson River R. R. for carrying a compressor and other apparatus for painting by the use of a spraying machine. In this case a Fairbanks-Morse, portable, combined gasoline air-compressor of 12 h. p. is mounted on a flat car. On one end of the car will be seen the paint barrels and the crane by which the compressor is handled. On the other end is space for dry sand and for a sand blast machine. In this same cabin is storage space for paint sprayers, pneumatic tools, hose couplings, etc. The dry sand box is filled through the roof. In the middle of the car will be seen the installation of the gasoline tank, and circulating water tank, the air tank and the compressor. Another engraving shows the arrangement of the sling for lifting the compressor on and off the car. It will be observed that the timber foundation and compressor are handled bodily by the sling and derrick.





Portable Air Compressor, Sand Blast and Paint Machines.



Foundation and Sling for Portable Air Compressor.

very heavy, but the two-mile section which includes the bridge and its approaches is single track, and to move trains safely over this section with the least possible delay the block system is employed; and rail circuits, for controlling locks on the signals, are run the whole length of the section. The track circuit is divided into two sections of about one mile each, so that for trains following one another there are two blocks of one mile each, while for opposing trains the two-mile block is retained, thus obviating the necessity of employing a signalman at the middle point. When the signalman at A sends forward a second train before the first one has reached B, he does so by lowering the arm of his signal only to the caution position, and the movement is made under the regulations for permissive blocking; but, as will be seen by the details given below, the second train cannot be sent from A until the whole of the first train has passed the middle point (a).

Controlled Manual Block Signals for Single Track.

The Ohio Connecting Railway is a short freight line connecting the Pittsburgh, Cincinnati, Chicago & St. Louis, about three miles west of Pittsburgh, with the Pittsburgh, Fort Wayne & Chicago, on the opposite side of the Ohio River. The traffic is

Mr. Grafton, signal engineer of the Pennsylvania lines west of Pittsburgh, has given us the following description:

This piece of road is a stretch of single track about 11,000 feet, including the bridge over the Ohio River. There is a long grade approaching from Verner station on the Fort Wayne road. The traffic is all heavy freight (and at times is very much congested). This was formerly handled by the Pan Handle train dispatchers, who issued a 31 order for each movement over the bridge. The present installation was made to secure quicker movements and greater safety, both of which purposes it has admirably accomplished.

The arrangement consists of a set of track circuits, including the entire block, and a semaphore signal placed at each end, operated mechanically by levers connected by pipe to the signals. Each lever is controlled by an electric lock on its latch. Ordinarily the movements are absolute block. This is accomplished by operating each signal with two electric slots mechanically connected, as shown by Fig. 2. To give a white (all-clear) signal it is necessary for both slots and the lever lock to be energized. This requires the entire track circuit to be clear of cars and everything at the opposite end of the block to be in the normal position; this is accomplished with very little complication and with ordinary appliances.

The permissive part is brought into service when it is necessary for two or more trains to follow one another closely. Under this arrangement the first train is allowed to proceed under a white signal. After it has passed into the block, say at A, the operator there asks the operator at B to set his electric switch so that A can give green. A then sets an electric switch at his own end; and these switches control circuits to interlocking relays at both ends. After the rear of the first train has passed point a the interlocking relays, in connection with the track relay at the ingoing end, A, complete a circuit which energizes the lever lock and one of the electric slots. This allows the operator to move his lever, the first half of which motion pushes up the unenergized slot and the last half pushes the signal to the caution position. As soon as the second train has passed point a a third train can be allowed to proceed under a caution signal, and so on indefinitely; but before either operator can again give a clear signal all the trains must have cleared the entire track circuit, either by going through or backing out at the ingoing end, and the electric switches must be returned to their normal positions. And before the operator at B can give a caution signal he must first give a white signal and go through the same procedure as that above described.

This apparatus in its present shape has now been in use nearly a year. The traffic has been unusually heavy for the last few months, but has been handled promptly without delay or accident of any kind. The first installation, made by the Union Switch & Signal Co., provided only for absolute blocking, but it was found to be impossible at times to handle the business fast enough in that way. The present arrangement was designed by Mr. G. B. Gray, Supervisor of Signals on the Pittsburgh Division of the Pittsburgh, Cincinnati, Chicago & St. Louis, and the work was done by his own men.

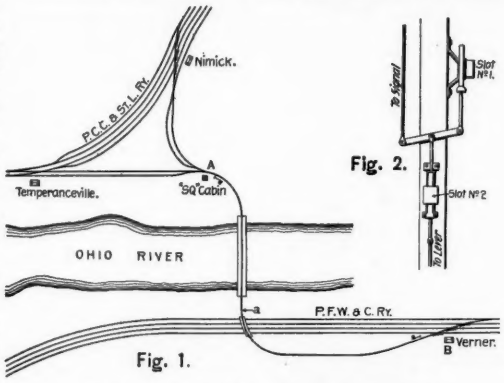


Fig. 1.

Fig. 2.

Block Signals—Ohio Connecting Railroad.

Train Accidents in the United States in April.

COLLISIONS.

Rear.

13th, on Pennsylvania road, at Mt. Dallas, Pa., a passenger train ran over a misplaced switch and into the rear of a freight train standing on the side track, badly damaging the engine and four freight cars. The engineman was fatally injured.

18th, on Pittsburgh, Cincinnati, Chicago & St. Louis, near Mooresville, Ind., a freight train broke in two and the rear portion after ran into the forward one, badly damaging several cars. The conductor was injured.

24th, on San Francisco & San Joaquin Valley, at Waukena, Cal., a freight train ran over a misplaced switch and into some freight cars standing on a side track. Two trainmen were injured.

28th, 4 a. m., on Chicago, Rock Island & Pacific, at Bonner, Kan., freight train No. 32 ran into the rear of freight train No. 30, damaging three cars. There was a dense fog at the time and it is said that the engineman of the second train failed to see the signals exhibited by the flagman of the first. One conductor and one fireman were injured.

30th, on Baltimore & Ohio Southwestern, near Mitchell, Ind., a freight train ascending a grade broke in two and several cars ran back into the head of a following freight, making a bad wreck. The wreck took fire and six loaded cars, including one containing 80 barrels of alcohol, were burned up.

And 6 others on 6 roads, involving 2 passenger and 5 freight and other trains.

Butting.

3d, on New York, New Haven & Hartford, at Middleboro, Mass., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track, badly damaging both engines and several cars. Three passengers were injured.

10th, on Lehigh Valley, at Rochester Junction, N. Y., butting collision between a passenger train and a freight train, badly damaging both engines. Five trainmen were injured.

14th, on Pennsylvania road, near Leechburg, Pa., butting collision of freight trains, wrecking both engines and 11 cars. One engineman was injured.

24th, on Boston & Maine, near Ware, Mass., butting collision of freight trains, badly damaging both engines and wrecking two freight cars. A gang of men happened to be at work on the track near the point of collision and the foreman succeeded in signaling both enginemen in time to enable them to slacken their speed.

25th, on Northern Pacific, at Spokane, Wash., butting collision of locomotives; one engineman fatally injured.

And 3 others on 3 roads, involving 6 freight trains.

Crossing and Miscellaneous.

3d, 1 a. m., on Belt Line, at Augusta, Ga., collision of freight trains, damaging several cars. Two firemen were fatally injured.

4th, at Scranton, Pa., a passenger train of the Delaware & Hudson ran into a freight of the Delaware, Lackawanna & Western at the crossing of the two roads. The engineman of the freight and two other trainmen were injured, the former fatally; and six passengers were slightly injured.

4th, at the Union Station, St. Louis, Mo., a passenger train of the St. Louis, Keokuk & Northwestern, which had been stopped just after leaving the station, was run into at the side by a passenger train of the Mobile & Ohio, coming out of the station on

another track. One passenger car was badly damaged and one passenger was injured.

5th, 10 p. m., on Central of New Jersey, at Easton, Pa., collision between a passenger train and a switching engine; one engineman injured.

14th, on Baltimore & Ohio, near Willock, Pa., a freight train ascending a steep grade broke in two and 13 cars ran back down the grade and collided with an engine which was standing at a coal chute, wrecking several of the cars. Two workmen were killed.

19th, 1 a. m., on Southern Pacific, near Lake Charles, La., collision between a freight train and an empty engine; three trainmen injured. There was a dense fog at the time.

19th, on Wabash road, at Fort Wayne, Ind., a passenger train collided with a switching freight train, wrecking three freight cars and damaging the mail car. Two trainmen were injured.

20th, 4 a. m., on Central of New Jersey, at Mauch Chunk, Pa., a freight train ran over a misplaced switch and into the side of another freight train, badly damaging the engine and several loaded cars. A brakeman was injured.

25th, 11 p. m., at Buffalo, N. Y., a locomotive on the Lake Shore & Michigan Southern collided with a mixed train of the Erie at the crossing of the two roads in Exchange street, wrecking one freight car. The wreck took fire, but the damage from this cause was slight. There was a dense fog at the time.

26th, on Baltimore & Ohio, at Napenee, Ind., an eastbound freight train entering a side track was run into by a westbound passenger train, and the engine and several cars were badly damaged. A fireman was killed and an engineman injured.

And 9 others on 8 roads, involving 1 passenger train and 14 freight and other trains.

DERAILMENTS.

Defects of Roadway.

14th, 4 a. m., on Pittsburgh, Fort Wayne & Chicago, at Donaldson, Ind., a freight train was derailed by a loose rail while entering a side track and nine loaded cars were ditched. A brakeman was injured.

23d, on Southern Pacific, near Gila Bend, Ariz., a freight train broke through a bridge which had been weakened by fire and the engine and several cars were wrecked. The wreck, including the bridge, took fire and was mostly burned up. The conductor and the fireman were burned to death and the engineman was badly injured.

And 5 others on 5 roads, involving 1 passenger train and 4 freight trains.

Defects of Equipment.

1st, 11 p. m., on New York Central & Hudson River, at Fort Plain, N. Y., a westbound freight of about 50 cars, running at high speed, was derailed by the automatic application of the air brakes, following the breakage of a coupling. Five cars were derailed, two of them being thrown across the passenger tracks.

4th, 3 a. m., on New York Central & Hudson River, near Canastota, N. Y., a westbound freight train was derailed by the automatic application of the air brakes, due to the rupture of a hose, and 10 coal cars were piled up in a wreck, blocking both the freight and the passenger tracks.

4th, on Southern California, at North Pomona, Cal., a fast passenger train was derailed; one trainman injured. It is said that the derailment was due to the breaking of a parallel rod of the locomotive, a piece of which derailed one of the trucks of the tender.

4th, on Lehigh & Hudson, at Easton, Pa., the engine of a freight train was derailed by the cowcatcher striking a guard rail, and ran into a freight house, tearing down a portion of it. The wreck took fire, but the flames were soon extinguished.

5th, on New York Central & Hudson River, near Newark, N. Y., an eastbound stock train, drawn by two engines, broke in two between the first and the second engine, the drawhead and part of the cowcatcher of the second engine being pulled out. Some of the detached parts fell to the ground and after being safely passed by the engine, derailed the tender and 13 cars.

6th, 1 a. m., on Western New York & Pennsylvania, near Ischua, N. Y., a freight train was derailed by a broken wheel and 16 cars, six of which were loaded, fell through a bridge into Ischua Creek. Two trainmen were injured.

12th, 2 a. m., on Flint & Pere Marquette, near Flint, Mich., a car in a freight train broke down and, with eight others, was derailed and wrecked. One trainman was killed.

21st, on Cincinnati, New Orleans & Texas Pacific, near Greenwood, Tenn., a freight train was derailed by a car breaking down, and the whole train, except the two locomotives and the 10 foremost cars, broke through a trestle and fell about 80 ft. to the ravine below. About 100 ft. of the bridge was wrecked. A tramp was killed and the conductor and one brakeman were badly injured.

28th, 4 a. m., on Philadelphia & Reading, near Oak Lane, Pa., a freight train was derailed by a broken journal and a brakeman was killed.

And 13 others on 12 roads, involving 13 freight and other trains.

Negligence in Operating.

30th, on Erie road, near Hubbard, O., a passenger train was derailed by a loose rail. It is said that the spikes holding the rail had been broken about one hour before by a derailed freight car.

30th, on Rochester & Lake Ontario, near Rochester, N. Y., a passenger train which became uncontrollable on a descending grade was derailed at a curve and one passenger car was overturned. Two passengers were killed and 13 were injured.

Unforeseen Obstructions.

8th, on Chattanooga, Rome & Southern, near Lafayette, Ga., a northbound passenger train was derailed by some sleepers which had been maliciously piled on the track.

11th, on Great Northern, near Big Sandy, Mont., a passenger train was derailed on an embankment which had been partly undermined by high water. A roadmaster riding on the locomotive jumped off and was injured.

12th, on St. Louis, Keokuk & Northern, at Old Monroe, Mo., a live stock train was derailed when running at full speed by a pile of ties which had been maliciously placed on the track. The engine and 10 cars of cattle were ditched, and the fireman was fatally injured.

13th, on Northern Pacific, near Moscow, Idaho, a freight train was derailed at a washout and the tender and four cars fell down a high bank. The fireman was killed and the engineman fatally injured.

14th, on Vicksburg, Shreveport & Pacific, at Girard, La., a gravel train was derailed by running over a steer, and the engine and four cars were ditched. The engineman and fireman were injured.

15th, on Great Northern, near Madison, Wash., the tender of a rotary snowplow was knocked off the track by a snowslide, and fell down a bank. Three employees were injured.

And 4 others on 4 roads, involving 2 passenger and 2 freight and other trains.

Unexplained.

16th, on Cleveland, Canton & Southern, at Cleveland, O., a passenger train, running about 10 miles an hour, was derailed on a drawbridge and ran some distance on the sleepers.

19th, on Southern Indiana, near Bedford, Ind., a freight train was derailed and the engine fell down a bank. The engineman and a man riding on the train were killed and another trespasser was injured.

20th, 8 p. m., on Chicago, Burlington & Quincy, near Big Rock, Ill., the St. Paul express train was derailed while running at high speed, and the engine and several cars were ditched and overturned. The dining car and one passenger car took fire and were burned up. The fireman was killed and the engineman, two other trainmen and one passenger were injured.

26th, 10 p. m., on Norfolk & Western, at Poe, Va., westbound passenger train No. 33 was derailed and the engine was overturned. All the cars except the sleeper were ditched and badly damaged. Four passengers were injured.

28th, on Pennsylvania road, near Broad Street Station, Philadelphia, train No. 78, proceeding toward the station, was derailed, and an empty parlor car ran against the support of a signal bridge and the bridge fell upon and crushed the car. The entrance to the station was blocked for an hour or two.

29th, on Wisconsin Central, near Chippewa Falls, Wis., the engine of a freight train was derailed and wrecked. The engineman was killed and the fireman and one brakeman were injured.

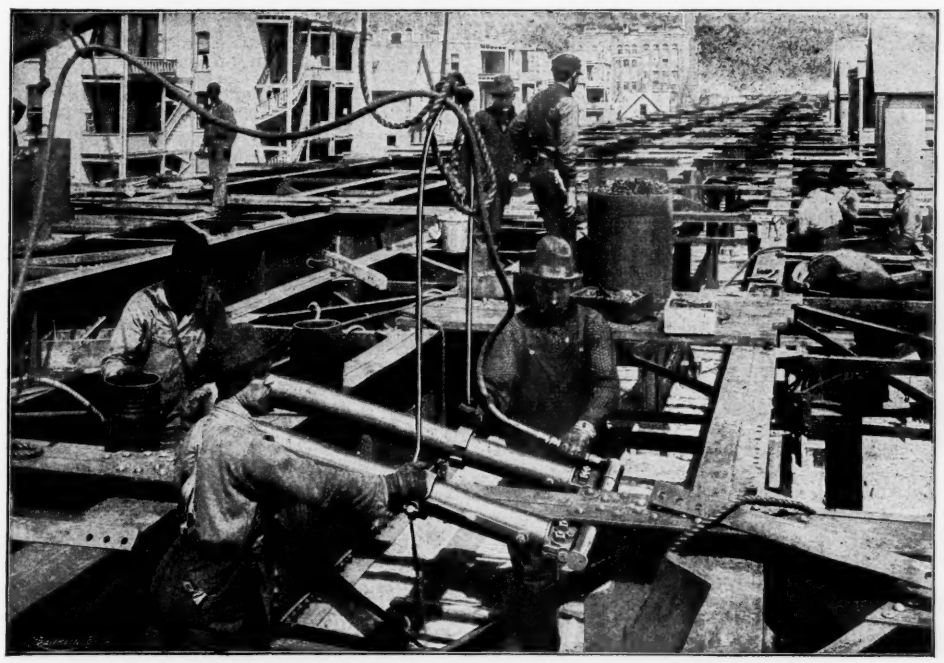
And 27 others on 20 roads, involving 1 passenger train and 26 freight and other trains.

OTHER ACCIDENTS.

3rd, on New York Central & Hudson River, near Rochester, N. Y., some boys stealing a ride on a freight train applied the air brakes and stopped the train so suddenly that several cars were badly damaged.

5th, on Portland & Rochester, at Westbrook, Me., the locomotive of a passenger train was wrecked by the explosion of its boiler; fireman killed, engineman fatally injured.

A summary will be found in another column.



Pneumatic Riveting on the Northwestern Elevated, Chicago.

Pneumatic Riveting on the Northwestern Elevated, Chicago.

A few weeks ago we published an engraving showing the portable plant used for compressing air for the riveting tools and rivet heading forges on the Northwestern Elevated, Chicago, and in this issue a further view is presented showing the appearance of the structure and the tools used for this work. The field riveting is being done by the Union Bridge Co. and the Elmira Bridge Co., for all of which compressed air tools furnished by the Chicago Pneumatic Tool Co. will be used.

When completed there will be in the main line of the Northwestern Elevated 0.92 mile of double-track structure from Institute place to Lake street, and 5.52 miles of four-track structure from Institute place to Wilson avenue, making the entire structure 6.44 miles long. In addition to the main line there will be 1.31 miles of single track and 0.21 mile of double track used for inclines, storage tracks and switching tracks at terminals. The total track mileage, including main line and terminals, will be 25.45 miles. These figures give some idea of the amount of riveting to be done.

At present the rivets of the cross framing where it is attached to the stiffeners, are driven by two yoke riveters, and the other riveters by two Boyer hand hammers; the rivets used are ⅞-in. steel. All the machines are size No. 000, and have pistons $1\frac{5}{16}$ in. in diameter by 5 in. stroke, and the hand hammers weigh 20 lbs. each. The yoke riveters are carried by booms swung from the portable frame upon which the compressor plant is mounted. Two men and a heater constitute a riveting gang, and on an average about 500 rivets are driven in 8 hours. We are told that this is considerably more work than could be done in the usual way with four men.

Signal Lights on the N. Y. N. H. & H.

The use of white lights in fixed signals has now been abandoned on all the lines of the New York, New Haven & Hartford. The substitution of green for white as the all-clear night signal and the introduction of yellow lights for distant signals, as carried out on the 10 divisions of the Eastern District, were reported in the Railroad Gazette of March 3 and 24. On Sunday, May 21, the same change was made throughout the Western District. On the New York Division there are 500 semaphores, including dwarfs. Signal Engineer Henry D. Beach changed the glasses in all of these, with his own force of men, in 9 hours and 8 minutes, beginning at 4:42 Sunday morning. Spectacle castings made to hold two glasses had been substituted for the old single spectacles on the two preceding Sundays, so that the task to be undertaken on the day of the change was to put green glasses in the vacant places in the arms of the home signal, and, in those of the distant signals, to take the green out of the upper opening and put it into the lower and supply its place in the upper with a yellow disk. All of the glasses were set with putty. At the same time the wooden arms of distant signals were taken off and new ones, painted yellow, were substituted. The back side of the new arms is painted white with a longitudinal black stripe in the middle the whole length.

Mr. Beach started from New Haven with a special train, and Foreman W. C. Grove started from Glenbrook, near the middle of the division, both gangs moving westward. Each gang consisted of 12 men. The length of road covered was from New Haven to Woodlawn and from New Rochelle to Harlem River, 73 miles in all. About one-fifth of the signals were distants, and the total number of glasses handled was about 1,500.

At cabins where there is no interlocking the changes were made in from 14 minutes to 20 minutes each. These towers have four home and four distant signals each. At New Haven 52 spectacles were changed in one hour and 20 minutes.

The Bridgeport Standard, the paper from which we gather the foregoing notes, says that "the new disks in the distant signals are of a rich color something like the bottles through the bottoms of which men look when they go fishing."

The Russian railroads have adopted uniform regulations as to the days and hours when stations shall be open for receipt and delivery of freight, there being many holidays in Russia and practice as to observing them not having been uniform heretofore on the railroads. As finally agreed upon, the strict holidays, when the stations will not be open at all, will number 10 in the year, besides all Sundays; on 25 other holidays they are to be closed half the day. On workdays from April to September inclusive stations are to be open from 7 a. m. to 6 p. m.; in the winter half of the year, from 8 a. m. to 4. p. m. It must be remembered that the Russians are pious.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY,
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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others can materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

In our news columns during the month of May we noted orders for 4,872 cars. Of these 2,035 were coal, ore and gondola cars; 2,056 were box, stock and refrigerator cars; 500 were flat cars; 140 were steel cars, and 141 were passenger and street railroad cars. Orders were also noted for 122 locomotives, 31 of which were for foreign roads, and of the total of 122, 22 were for passenger, 82 for freight and 18 for switching service. This shows a further heavy falling off in orders from the April record, and compared with the month of March, when orders were noted for 21,667 cars and 541 locomotives, the reduction is remarkable. As the weeks go by and the builders have a chance to catch up with their orders, it would seem that early deliveries must be easier to obtain; but the crops are by no means safe yet, and there is much uncertainty about them. Several roads are holding back orders on account of the high prices now asked for rolling stock by the builders.

The readers of the Railroad Gazette have a peculiarly personal interest in the new President of Yale University. He has written a book on railroads which is a classic. Few men have stated so many essential facts in so few words and yet so clearly as has President Hadley in his "Railroad Transportation." His occasional articles and addresses on various phases of the social economy of railroads have helped to gradually spread correct theories as to the relations of railroads to each other and to the people. But aside from that, Prof. Hadley was a regular editorial writer for the Railroad Gazette in the early days of the Interstate Commerce Commission and did much to help to start all of us right in that great experiment in government control. Indeed we hoped later that he might have been persuaded to take a place on the Commission, where his capacity for mastering details, his strength in generalizing from ascertained facts and his power of presenting and sustaining his case would have been of great service to the railroads and to the country. But as matters have turned out it was doubtless better that he should stay where he did. President Hadley is a scholar, but he is a good deal more than a scholar. He has the constructive temperament and he comes to his new work at an age when that temperament is still strong and active. Criticism and repression are to him merely incidental—not the real end of human effort. His temperament would lead him to stimulate and use the forces around him. This is illustrated by a few words quoted recently from a magazine article which he wrote five years ago, speaking of the place of athletics in college: "If there is danger of distorting the sense of proportion among the students it is to be remedied not by less encouragement to athletics, but by more encouragement to study."

A brakeman is no longer a brakeman. This condition (as regards passenger trains) has been gradually impressing itself on the minds of railroad officers during the last 30 years, or since Mr. Westinghouse first enabled us to put the braking power wholly in the hands of the engineman. A similar condition bids fair soon to prevail in the freight train service, and then we shall have nothing but flagmen or porters or guards on any trains, and anyone desiring to learn the art of hand braking will probably have to take his lessons in yard work. If the ends of cars are made strong enough, so that yard men can carry to perfection their long cherished and constantly tried scheme of kicking off cars without riding them at all, hand braking will become a lost art, and we shall be on a level with England, where the genuine art was never learned. If block signals come into general use in this country the train man's vocation will be still further narrowed; for the flagman or hind-end man, like the guard on English trains, will come to look upon flagging as a waste of time and will stick to his train; and his superiors will acquiesce in his conclusion, as is done in England. We have been led to these reflections by reading in a California paper that on the overland passenger trains of the Atchison, Topeka & Santa Fe, the forward brakeman has been superseded by a negro porter. The account before us states that the colored person can be hired for less money. Whether this be actually true, we are not informed; but the change would probably be justified, regardless of the question of wages, by the greater ease with which capable and satisfactory porters may be found among negroes. There is no question but that the main duty of passenger brakemen, except the hind-end man, is to attend to the wants and needs of the passengers, and it logically follows that this duty should be first considered in selecting men to fill such places. At the same time the knowledge of how to protect trains from collision, how to switch cars and make up trains, and, in general, the duties of brakemen under the former conditions, cannot be wholly ignored; and it would seem to be quite important to select porters who will be apt to learn these things, and then to see that they have opportunity to learn them. Sleeping-car porters have on many occasions rendered valuable assistance to train-conductors in emergencies; but not all trains have sleeping cars, and the smaller the force of regular brakemen the greater is the likelihood that the assistance of a semi-outsider will become temporarily welcome. It appears that the Atchison is making this change throughout its lines; and we understand that one other road west of the Missouri has taken all of the white brakemen off from its passenger trains. Whether the porters are trained as flagmen, or dependence is placed on block signals, we are not informed.

Metal Draft Gear.

At the last meeting of the Texas Railway Club, Mr. J. R. Cade, Master Car Builder of the Southern Pacific, at Houston, discussed the question of metal draft gear for freight cars, and presented some facts as to the life of wooden draft timbers. He referred to the capacity of cars having been increased from 20,000 to 40,000 lbs. with practically no change in the draft rigging; 1-in. follower plates, a 6-in. spring and the same size draft timbers being used in both. Now, when the size of cars has been still further increased most of these parts have been somewhat strengthened, yet one of the largest items in the repair account to-day is that of the draft rigging, showing it to be still a weak point in the car.

In most cars, so far, the additional strength of the draft rigging has been obtained by increasing the size of the timbers, but it appears to be impracticable to continue this enlarging process indefinitely, and consequently a number of roads are replacing wooden draft timbers of freight cars with metal beams. The opinion was expressed that it is necessary to make the draft rigging of small capacity cars as strong as that of the large cars, if both are to be run in the same trains and be subjected to the same shocks in switching.

The repair records of the Southern Pacific show that in 1892 more than one-fifth of the whole number of draft timbers on its cars were removed, at which rate practically all would be renewed in the course of four and one-half or five years. Again, for 1895 and 1896, the records show that the number of draft timbers replaced in each of these years was about 30 per cent. of the total number in service. Figures from other roads were found to compare quite closely with these, and it is thought safe to estimate the life of wooden draft timbers at about three and a half years, the tendency being to shorten the life of these parts as larger cars are built. Besides the actual cost of replacing broken draft timbers, further losses arise through delays to trains and by taking the cars out of service for repairs, so that it is difficult to determine even approximately what the total cost for this item may be.

Mr. Cade stated that in 1893 he equipped for trial a car with metal draft rigging, having about 50 less parts than the wood rigging, and that it has now been running six years without repairs; also 15 other cars similarly equipped have been in service from two to six years without repairs and none of the metal beams have broken. He is also advised by a road having had several thousand cars fitted with metal draft gears for two or three years, that no breakages have occurred. It is thought the metal rigging should last twice the life of the car, cause a material reduction in the repair account and result in the cars being more continuously in service.

The Time Interval at Exeter.

The reports of the evidence taken at the two coroner's inquests on the terrible collision of passenger trains at Exeter, Pa., on the night of May 12, indicate that the examinations were conducted by amateurs, and important questions concerning the causes of the disaster appear to have been touched upon but lightly if at all; but the facts which were brought out afford a pretty fair explanation of the trouble. We give an abstract in another column.

It seems to be certain that the second section of train No. 12 left Reading about six minutes after the first section; that the prescribed time interval was five minutes; that both trains ran the seven miles from Reading at somewhere near the schedule speed of 40 miles an hour; that neither engineman kept a good lookout for the train-order signal at Exeter; that the engineman of the second train had had little experience as a runner of passenger trains; that his fireman was making his first trip over this division of the road, and that the collision occurred in from two to four minutes after the first section reached Exeter. The lack of exactness in this last item suggests the difficulty which will be experienced in accurately apportioning the responsibility for the collision.

There is nothing in the published evidence to indicate that Wildemuth, engineman of the first section, did not back his train immediately, or that the brakeman, Miller, did not go back as fast as he could; hence the delay caused by running past the station could not have been great; but even a little delay is dangerous where another train is following in five minutes, and there is little use, so far as concerns Wildemuth's and Brommer's responsibility, in trying to settle whether it was one, two, three or four minutes; for even one minute would reduce the interval of time on which the next following train necessarily depended for safety.

The conductor of the first section argued before the Norristown jury that the backing of his train was justifiable because it ought to have been stopped several hundred feet back of where it did first stop; but in doing this he ignored the vital condition that, if the train had stopped in the right place the brakeman would have been able to start back with his red light a good many precious seconds sooner. If the five minute rule is as elastic as the circumstances of this case indicate, this brakeman probably knew of it and therefore not only could, but probably would, have gone back promptly.

The rule never to move a train backward without first sending a flagman is an unwritten rule, but it is clearly implied when a time interval is prescribed. The schedule of this train gave it a right to run southward; but the moment it began to move northward it began to diminish the time interval between itself and the next following train; and this time interval is established for what purpose? Obviously, to allow signals to be sent back *away from* the train. The length of the time interval is a measure, more or less exact, of the distance that there should be between the train and the signal which is to protect it. If the train goes back with the man he may as well ride. His hand-lamp is no better than the tail lamp on the car, except that he can swing it.

But assuming that the diminution of the time interval by the misconduct of the men in charge of the first section was not more than one, two or three minutes, it follows that there was still an interval of four, three or two minutes before the second train had a right to appear at Exeter; and it was bound to stop before passing the train order signal (opposite the telegraph office) if that signal indicated "stop." The liability of finding a stop signal and the fact that the runner knew that he was at least closely approaching his five-minute limit would dictate caution; and yet the runner ap-

pears to have admitted on the stand that he was approaching at 45 miles an hour, around a curve which made his view very short. The wayside flagmen, having no electrical or other communication with each other, or with anybody else, apparently are required to show a green (caution) signal from the fifth to the tenth minute after a train passes; but so far as we can gather, the flagman stationed a mile north of Exeter showed white (all clear) before the five minutes had expired.

The verdict of a coroner's jury is about the most unreliable thing in the world, being made up generally by novices, whose irresponsibility is only matched by their ignorance. The two that have been rendered on the Exeter collision appear to be mixtures of good and bad rec mmendations. As the evidence which we have given an abstract of in the foregoing paragraphs does not include the whole of the facts which must be known to form a correct judgment on the whole case (though most readers will be able to form a practically just opinion), we cannot condemn the juries; and, indeed, they have so nearly hit the mark in some of their generalizations that one is inclined to be thankful that our crude legal machinery has given as good a result as it has, and to look leniently on its errors.

But nevertheless it seems proper to point out that the trouble was wholly in the time interval system, and the way it was managed. In censuring the dispatcher and the trainmaster, and in condemning the lack of telegraph facilities and of color-blind examinations the jurymen were, indeed, touching upon defects which undoubtedly need correction, but they were weakening the force of their main argument, or what should be the main argument. Unless there are grave errors in the testimony as we read it, a jury should put the main emphasis on the shortness of the time interval or the neglect of the men who failed to do their part toward maintaining it. The officer who made the rules is responsible for the length of the time interval prescribed; and the dispatchers, trainmasters and other officers who were examined by these juries have to do with the time interval only so far as they have a part in the discipline of the trainmen and station men who directly manage the trains. The telegraph is not necessary for the maintenance of the time interval; and possible color-blindness does not seem to figure in this case, for the only question about lights, if there be any, is between white and a color, and that is not where colorblinds make their mistakes.

The time interval cannot be condemned per se. But to safely use it, the interval must be long enough to allow something for errors of judgment; and the stations must be near enough together to counteract the differences in speed that exist as between different trains. Quite recently we noticed on a prominent road two express passenger trains about three minutes apart, which, according to the rule, should have been ten minutes apart, and they were on a crooked part of the line. The trouble was that the time interval was maintained at stations far apart, and the second train ran much faster than the first. It seems to be admitted that Orrell ran faster than did Wildemuth; and yet that neither varied much from the schedule; Wildemuth did not run much too slow, and Orrell not much too fast; and yet, together, they practically used up the five-minute leeway. Whether Endt (the flagman in the tower, a mile north of Exeter) neglected to notify Orrell that he was too close to the first section, or the notification was given but disregarded, is a point which, while the most crucial in the whole inquiry, seems not to have been thoroughly cleared up.

English Railroad Accidents in 1898.

The number of passengers and employees killed by train accidents on the railroads of Great Britain during the year 1898 was 50 per cent. greater than during the year 1897, a fact which illustrates in a striking way both the untrustworthiness of percentages, for short periods, and the remarkable degree of safety which the English railroads have attained to—for the figures of 1898, while so much higher than those of preceding years, are still far below those of, we believe, any other country in the world.

The Board of Trade report, just issued, shows 25 passengers, 16 employees and two other persons killed and 632 passengers, 110 employees and three other persons injured; the two years showing as follows:

	1898.		1897.	
	K.	Inj.	K.	Inj.
Passengers	25	632	18	324
Employees	16	110	9	140
Other persons	2	3	7	12
	43	745	34	476

Adding the accidents from other causes, the total number of casualties "in the course of public traffic" during the year was 7,522, as shown in the table below. In addition to this, the report makes mention of the casualties to passengers around stations, to employees killed or injured in freight houses, etc., which items bring the totals for the year up to 1,259 persons killed and 16,091 injured.

Casualties, United Kingdom.

	1898.		1897.	
	K.	Inj.	K.	Inj.
Passengers, train accid'ts, etc...	25	632	18	324
" other causes.....	128	1,238	115	1,315
Employees, train accid'ts, etc...	16	110	9	140
" other causes	488	4,039	501	3,989
Other persons	522	324	522	334
	1,179	6,343	1,165	6,102

The last item, 522 killed, includes 402 trespassers. As we have always held up to ourselves the practice of Europe as a perfect example of police regulation for the suppression of trespassing, it may be well to note this reminder that more fences and more policemen would not be likely to completely cure our tramp evil.

The report contains the results of the inquiries made by the inspectors of the Board into 40 of the more serious accidents, being those investigated during the last three months of the year. (Other investigations have been given in the quarterly reports.) The 40 reports now given fill 184 large pages and a number of them are accompanied by drawings. One of the worst disasters was the derailment of a night express, running 60 miles an hour, at Wellingborough, on the Midland, Sept. 2, by a baggage truck which ran off the platform and fell on the track just before the train approached. Five passengers were killed and 65 injured. The truck was carelessly left on a part of the platform which sloped toward the track. The man at fault was a mail carrier, not employed by the railroad, and in fact not charged with any duty after delivering the mails at the platform. It was, however, the custom of this man, as of such messengers generally, to assist the station men in handling the mails, and the railroad company accepted full liability for the accident. The inspector, Colonel Yorke, considers the question of brakes and safety chains on baggage trucks and the construction of platforms. Brakes ought to be adopted at all stations where the platforms slope toward the rails. Chains or hooks would be likely to be neglected at busy times. The platform at Wellingborough is only two feet above the rail, and Colonel Yorke is glad to hear that the company is going to make it higher. From the absence of any very strenuous recommendation in this report that all platforms ought to be made level or inclined downward away from the track, we judge that the cost of making changes would be considerable and that a good many such changes need to be made in England. Colonel Yorke does not agree with the view that a cow catcher on the engine would have prevented this disaster. He says that the fenders fixed vertically at the front of the engine over each rail probably afforded as much protection as would have been given by a cow catcher. The fact that a pilot generally clears the rail about four inches apparently convinces Colonel Yorke that a piece of iron big enough to derail a train would be pretty likely to pass under it. Notwithstanding all this fine theorizing, we "guess" that a good many American railroad superintendents could tell of cases where obstructions as ugly as a baggage truck have been safely thrown aside by engines fitted with cow catchers.

At the Broad Street Station of the North London Railway, on Sept. 20, a passenger train entering the station was not properly controlled and the engine ran into the hydraulic buffer stops, doing considerable damage and slightly injuring 15 passengers, besides giving excuses to some others to demand from the company compensation for damage to their hats. The cause of this accident was simply an error of judgment on the part of the engineman, and the principal comment of the inspector, Colonel Yorke, is a reiteration of the well-known opinion of the inspecting officers, that trains entering terminal stations should, except in emergency, be controlled by the use of the hand brake, reserving the power brake to fall back upon in case of an unexpected obstruction. He does the railroad the justice, however, to quote the statement of the manager, that during the 12 years ending Sept. 30 last, 1,369,400 trains have stopped in Broad Street Station, and that until this case only one train has ever struck the buffer stops during all that time; and that one was fitted with the old-fashioned chain brake.

On the Tralee & Dingle Light Railway, near Aunascaul, Ireland, on Nov. 24, a passenger train was derailed on a down grade; and the verdict of the inspector, Colonel Addison, is that the cars were overturned by a heavy squall of wind. This accident is noticeable chiefly on account of the fact, to which it draws attention, that in three cases lately passenger trains on Irish railroads of three feet gage have been blown off the track. It would appear that not all of the half-baked railroads in the world are in the United States.

The track on the Tralee & Dingle was found in a very dilapidated condition. The inspector says that it should be put into proper order as soon as possible, as in its present condition it is not fit for a speed of 25 miles an hour; and if the company cannot provide vehicles less liable to turn over, passenger traffic should be suspended during heavy gales.

April Accidents.

Our record of train accidents in April, given in this number, includes 38 collisions, 74 derailments and 2 other accidents, a total of 114 accidents, in which 24 persons were killed and 68 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which cause no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS.

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	4	0	0	4
Misplaced switch	4	1	3	8
Failure to give or observe signal	2	0	1	3
Mistake in giving or understanding orders	0	2	0	2
Miscellaneous	1	0	10	11
Unexplained	0	5	5	10
Total	11	8	19	38

DERAILMENTS.

Loose or spread rail	3	Automatic Application air-brakes	2
Failure of bridge	3	Careless running	1
Defective frog	1	Track repairers	1
Broken wheel	2	Animals on track	2
Broken axle	6	Landslide	2
Fallen brakebeam	1	Snowslide	1
Failure of drawbar	5	Washout	2
Broken car	4	Malicious obstruction	3
Loose cowcatcher	1	Unexplained	33
Broken parallel rod	1		74

OTHER ACCIDENTS.

Boiler explosion	1
Other causes	1
	2
Total number of accidents	114

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	7	0	7	6
Defects of equipment	4	22	1	27	23
Negligence in operating	24	2	0	26	23
Unforeseen obstructions	0	10	1	11	10
Unexplained	10	33	0	43	38
Total	38	74	2	114	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	12	12	1	25
Freight and other	54	62	1	117
Total	66	74	2	142

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other accid's.	Total.
Employees	6	10	2	18
Passengers	0	2	0	2
Others	2	2	0	4
Total	8	14	2	24
Injured.				
Employees	21	18	0	39
Passengers	10	18	0	28
Others	0	1	0	1
Total	30	37	0	68

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	0	0	2	2
Defects of equipment	0	0	4	5
Negligence in operating	2	23	6	21
Unforeseen obstructions and maliciousness	0	0	3	5
Unexplained	0	5	3	6
Total	2	28	18	39

Seventeen accidents caused the death of one or more persons each, and 18 caused injury but not death, leaving 79 (69 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with April of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions	38	50	36	21	33	37
Derailments	74	68	63	72	75	62
Other accidents	2	7	6	1	9	5
Total accidents	114	125	105	94	117	104
Employees killed	18	17	16	22	17	17
Others killed	6	1	5	6	10	11
Employees injured	39	23	54	49	50	59
Others injured	29	25	36	15	40	29
Passenger trains involved	25	31	34	22	37	30
Average per day:						
Accidents	3.80	4.17	3.50	3.13	3.90	3.47
Killed	0.87	0.60	0.70	0.91	0.96	0.93
Injured	2.22	1.60	3.00	3.47	3.00	2.93
Average per accident:						
Killed	0.21	0.14	0.20	0.30	0.23	0.26
Injured	0.60	0.38	0.86	1.10	0.76	0.84

Serious accidents to passenger trains are not numerous this month. The only fatal case is that of the runaway train near Rochester, N. Y., on the 30th. The line on which this derailment occurred is what the English would call a "light" railroad, its principal business being travel to summer resorts. The derailment near Big Rock, Ill., on the 20th, occurred, it is said, while the train was moving at the rate of 50 miles an hour, but the passengers very fortunately escaped with slight injuries, except in one instance.

Damage to freight trains by the too sudden application of air brakes occurred at several places in April. One of these cases is reported as having been due to the action of mischievous boys, who were stealing a ride; and lawlessness of various kinds is so common in central New York State that the railroad detectives, it is said, have more work than they can attend to. Even with employment com-

paratively easy to find, the ranks of the railroad vagrants continue well filled, and if the ingenuity of these fellows continues to flourish it will be necessary to have experienced police officers on freight trains. We would suggest to brakemen who fear that the introduction of powerful locomotives and automatic brakes will throw them out of their jobs, that they make themselves indispensable to their employers by their activity in extirpating tramps and in other ways promoting the safety of trains.

The report of a disastrous accident to a passenger train on the Burlington road in Wyoming during a great flood on April 14 was entirely unfounded.

We have reports of three street car accidents in April in which 10 persons were injured.

Concerning the article which we printed last week on the compound rail we have received two letters from chief engineers of important railroads. One of them says: "I can say nothing that would add to the condemnation due to this device, but I might emphasize the absurdity of the claim of economy. The actual difference between the cost of new rail and old rail of 10 years' service under heavy traffic rarely exceeds $5 a ton. Most of the old rail is bought for relaying and for use in sidings and yards. In the case of the compound rail the portion to be renewed would, in any case, be classified as scrap. Ignoring entirely the structural defects of a compound rail it lacks even the merit of economy. Under the present extremely heavy axle loads, say 45,000 lbs. per axle, moving at 70 to 80 miles an hour, it is essential that the rails should be rigid and without internal motion. In the case of the compound rail the slightest misfit of the parts or wear of bolts or rivets would lead to its rapid destruction. Further, at every joint the lapped portion of the rail would be insufficient to prevent worse sagging than now occurs with double angle bars." The other chief engineer says: "Your paragraph about the entire inadequacy of the ordinary design of compound rail is, so far as I know, a criticism that has never before been in print, but it has been one of the silent reasons which all engineers have had in mind when turning their backs on the inventors of compound rails."

The new State Railroad Commission in Louisiana is already doing business on a large scale. Hearings have been held in New Orleans at which complaints were presented concerning freight and passenger rates, location of stations and a number of other things. A strong demand was made for the reduction of rates on rice to New Orleans. The commission is said to have decided to forbid a charge of more than two dollars a night for sleeping car berths within the State. The present rate between Shreveport and New Orleans is $2.50. One of the rules made by the commission is that all trains must stop at every county seat, and the Superintendent of the Yazoo & Mississippi Valley has already applied for an exception in the case of an express train of that road. The commission has not yet granted the request, and it is said will insist on the enforcement of its rule, basing its decision partly on the fact that the Supreme Court of the United States has lately sustained a similar rule in Ohio. But as the Louisiana rule was prescribed by the three commissioners, while that in Ohio was made by the full Legislature of the State, there is a marked difference between the two cases; and we venture to predict that the Louisiana road will appeal from the decision of the commissioners.

The Exeter Collision.

The coroner's jury in the case of the 29 persons killed in the rear collision on the Philadelphia & Reading, at Exeter, Pa., May 12, has found that the accident was due to the negligence of certain employees. The jurymen censure George C. Bowers, trainmaster, of Philadelphia, for assigning to the special train a crew unfamiliar with the main line; the engineer, Orrell, and the conductor, Magee, of the second section, for reckless running; and the engineer, Wildemuth, of the first section, for having passed the signal at Exeter and then backing up 236 feet; and the train dispatcher, James Rourke, is declared negligent in not informing the second section of the delay of the first. They recommend that "the independent tower system" be abolished and that the ten-minute interval between passenger trains be enforced.

Warrants have been issued for the arrest of Wildemuth, engineman, conductor of the first section of the train; Orrell, engineman, and Magee, conductor, of the second; also for James J. Rourke, train despatcher. Trainmaster Bowers, of Philadelphia, will, it is said, be prosecuted in that city. The members of the jury express the desire that no manslaughter proceedings be brought against the men. For misdemeanor the highest penalty is $5,000 fine or five years' imprisonment.

The report of the evidence taken at the inquest gives some particulars which supplement the information given in our report of May 19. We note the salient points of the testimony, in the order in which it is published in the Reading Telegram.

The operator at Exeter received an order to stop the first section of the passenger train about 8.40 p. m. The train order signal was out about one minute before the train came in sight. He did not have the order ready for the conductor until one minute after the conductor was in the office ready to take it. The order was simply a clearance card. The signal tower north of Exeter is one mile from the station and there is no connection from the tower to this or any other station or tower. (None of the reports of the inquest which we have seen give any testimony from the attendant at this tower; and the testimony of the engineman of the second section seems to indicate that he claims to have received at this point an all-clear signal—a white light.) The conductor of the second section testified that he left Reading at 8.42, six minutes behind the first section. Immediately after the collision he looked at his watch and it was 8.53.

Harry Orrel, engineman of the second section, had never run passenger trains regularly. He was running about 45 miles an hour when he caught sight of the tail light of the preceding train and of the brakeman's hand lantern practically at the same moment. A few seconds before this he saw a white light waved by a trainman of a northbound coal train, which he took for an all-clear signal intended for himself. When he saw the tail light of the preceding train it was about 750 ft. distant, but at the speed he was running he would have needed 1,350 ft. in which to stop. Orrel said he was familiar with all parts of the Reading road, but principally the New York Division. He had been lying idle at Harrisburg all the afternoon, and about two o'clock had taken two glasses of beer. At the moment of collision Orrel's train was moving about 12 miles an hour.

Orrel's fireman, W. L. Everett, had been a fireman on the Reading one year and had never before run on the main line.

Conductor Brommer of the first section testified that the rear car of his train stopped before it passed the train order signal. He did not give the order to back the train. He heard the whistle of the second train about five seconds after his own train had backed up and stopped. The distance it backed was about 236 ft. His brakeman ran back as quickly as possible, but this did no good, as, in consequence of a curve in the line, the engineman of the second train saw the tail lights as soon as he saw the brakeman's light. Asked if the company did not have a rule prohibiting the backing of a passenger train Brommer replied in the negative. He said that the time of his arrival at Exeter was 8.49. The brakeman had got back about four car lengths when the collision occurred.

Daniel Wildemuth, engineman of the first section, has been a runner for 19 years, and on the main line five years. His train ran about 700 ft. after he applied the air brakes.

Second Inquest.

Coroner McGlathery held an inquest at Norristown May 24, 25 and 26, some of the deaths having occurred in Montgomery County. The publication of the testimony given at Reading led some of the witnesses to amplify their evidence at Norristown, with a view to justify their own conduct. The men on the first section claim that the collision occurred at or before 8.51, while those on the second claim that the time was 8.53. The operator at the station says that when Conductor Brommer of the first section jumped on to his train to pull the bell cord he (the operator) looked at the clock, supposing that the train was to depart, and the time was 8.51.

A towerman 1½ miles south of Reading testified that the trains passed him two minutes apart. Conductor Magee testified that he left Reading four minutes behind the first section. This signalman said that since the collision instructions had been issued to keep trains five minutes apart.

Conductor Brommer claimed that if his train had not been backed up the brakeman could not have got back to the curve as soon as he did, and consequently the result would have been just as bad if the train had stood still. If the engineman of the first section had stopped at the train-order signal, the rear of the train would have been still farther back and presumably the collision would have been worse. The train order signal being against the train, it was within the rights of the train for the rear end to be back far enough to permit the engine to stand at the signal.

One of the towermen examined at Norristown was unable to speak English.

Train Despatcher Rourke was questioned concerning the orders given by him, and the rules governing the trains. No one, he said, could have suspected that two trains supposed to be running six minutes apart would collide after the first one had been stopped but one minute.

On May 27 the Norristown jury found the railroad company primarily responsible for this accident because it "had never established a modern and adequate system of communication by telegraph or telephone between all signal stations and the main office; because it despatched trains at too short intervals; failed to provide a sight and color test at least once a year for employees required to distinguish colors on signal boards at a distance; and failed to require signal tower men and crossing watchmen to have accurate timepieces. . . . We are further of the belief that there is absolutely no safety in running trains according to their present system and rules. . . . We further find that mistakes were made by employees, but that they were insufficient in our judgment to have caused the collision had a proper system of signals been in use on that portion of the line."

Chicago Track Elevation.

At a meeting of the Chicago City Council, Monday evening, May 22, an ordinance was passed providing for the elevation of the tracks of Chicago & Alton, Atchison, Topeka & Santa Fe and Chicago, Madison & Northern, running southwest from a point near 18th street; and also the tracks of the Union Stock Yards & Transit Co., Chicago Terminal Transfer Co. and the Pittsburgh, Cincinnati, Chicago & St. Louis where they cross the first named roads. The first three run parallel from the point of beginning to Ashland avenue, within which distance 17 joint subways are provided. The Alton elevation is then to continue and come to grade beyond South California avenue, making 16 additional subways under its tracks only, while the elevation of the Atchison, Topeka & Santa Fe and Chicago, Madison & Northern is to come to grade near the crossing of the Illinois & Michigan Canal, in which distance there are to be two more subways under the tracks of both roads, which are parallel. In all, the ordinance covers the raising of about 13 miles of track at an estimated cost of about $2,500,000.

A similar ordinance has been before the Council at different times during the past two years, but has never been approved by the Chicago & Alton because the elevation would badly damage its property along the river east of Halstead street. For about 1¼ miles the river at that point is lined with grain elevators and lumber yards which it would be difficult to reach if the tracks were raised. The Alton has heretofore held that the elevation should commence at Halstead street instead of 18th street, but it is not yet known what action the new management of that road will take in regard to the new ordinance.

Railroads in Russia in 1898.

The mileage of Russian railroads was considerably increased during the year 1898. Of the newly constructed roads, the principal are on the Trans-Siberian line section from Obi to Krasnoyarsk, 471 miles; and from Taiga to Tomsk, 59 miles. Regular trains have been placed on the lines from Vologda to Archangel, 394 miles. The following lines have been opened, viz: The Moscow-Jaroslav-Archangel, the Riazan-Ural and Moscow-Windau-Rybinsk, in the Moscow region; Lugansk-Millerovo, in the region of the Donetz basin; and Lukov-Lublin, in the Vistula region. The Russian railroads, on January 1, 1899, consisted of twenty-eight connecting lines, of which eighteen are controlled by the Government and ten by private companies.

The total length of the Russian lines (with the exception of the Finland railroads, 1,590 miles long, which are controlled by their own directors, officers, and statutes) is 26,797 miles. This summary of the railroads in operation does not give a full idea of the extent of Russian railroad mileage at the beginning of the present year, as a number of lines are in course of construction, which, when completed, will furnish a total of 7,015 miles. On many of the roads under construction, temporary communication was opened last year, and others will be opened in the near future.

The most important line under construction is the Poltava-Kief, which will furnish an outlet for the products coming from a rich and densely populated region to Kief and farther west. The Poltava government is in the rich black-earth belt, the principal occupation of its inhabitants being agriculture. This, it is estimated, will furnish 219,355 tons of freight annually.

It is thought that the projected line from Nizhni Novgorod south will carry 129,032 tons the first year, and that its business will increase rapidly.

It is proposed to construct a line from Zemetchina on the Syzran-Viazma Railroad to Kustarevka, to furnish an outlet to an area of 1,445 square miles, with a population of 112,000.

A line will be built from St. Petersburg southward to Kief, which will shorten the route 166 miles.

Measures will be taken to increase the capacity of the Novorossisk branch of the Vladi-Caucasian Railroad by constructing a new line from the Caucasian station to Ekaterinodar, and by laying down a second track from Ekaterinodar to Novorossisk, which is the terminal point for goods exported by the Vladi-Caucasian Railroad. The movement of freight on this line in 1895 amounted to 601,613 tons of grain and 64,355 tons of miscellaneous freight. Now that the Tohoretsk-Tsaritsine line is completed, cargo from the Volga will move on the Novorossisk branch.

In addition to the foregoing, several roads will be constructed by the Government, viz.: From Vladivostock to Kerch, which will run through a rich mining district; the Volchansk-Kupiansk line, 73 miles, a local road affording an outlet to an area of 1,288 square miles, with a population of 136,000; the Piatihotka-Koristovka line, which will connect the Catherininsk and Kharkov-Nicolaev railroads and will be also of local importance.

A line will be built from Chiatury to Darkveti, four miles long. In order to develop the manganese industry of Transcaucasus, the so-called Chiatury branch of the Transcaucasian Railroad was constructed in 1891,

which carried 80,645 tons of manganese during the first year and a total of 193,549 in 1896, showing the development of the manganese industry in that region. But this branch does not meet the requirements, as the mines extend beyond Chiatury, and the line will be extended.

Concessions have been granted to private corporations to build the following lines: From Yalta to Bahchisarai, 45 miles; from Novozubkovo to Novgorod-Seversk, 76 miles; from Belgorod to Sumy, 96 miles; from Holm to Belzshetsk, with a branch from Zamostie to Lublin, 119 miles; from Valk to Marienburg, with branches, 129 miles; and three small lines in the manganese region in the Transcaucasus, 26 miles.

A new tariff has been worked out for direct communication with the ports of the Far East, and this decides an important question concerning Russian commercial relations with distant ports. With the introduction of the new tariff, it becomes possible to transport goods to the ports of the Far East from every railroad station of the interior of Russia. During the past year, an agreement was made with foreign railroads concerning tariffs for kerosene and grain cargo coming from stations of the Russian railroads direct to the interior stations of German and Netherland roads. The interior tariff on sugar and salt and the general cargo tariff have also been reviewed this year. It is proposed to establish one general tariff for all the interior railroads, but this will not be done until next year. Owing to the failure of crops this year in some of the governments, a special tariff was established for the transportation of seed grain and cattle to the famished districts.

Last year, a project for reorganizing the Ministry of Ways and Communications was presented to the Government for consideration, and is nearing its solution.—Consular Reports.

TECHNICAL.

Manufacturing and Business.

The Chicago Pneumatic Tool Company has recently arranged to sell the entire output of the factory of the National Pneumatic Tool Company, in connection with the large line of pneumatic tools it now handles. This gives the Chicago Pneumatic Tool Company control of the sales of the Phoenix rotary drills, the new Haesler piston drills and the appliances manufactured by the National Pneumatic Tool Company, as well as the Boyer riveters, hammers and piston air drills.

Torsion proof freight car roofs and Packer's insulating paper will be used on 210 refrigerator cars recently ordered by Swift & Co., and the same roofs with Neponset insulating paper will be used on 2,000 refrigerator cars ordered by Armour & Co.

S. A. Crone, who has resigned as Assistant Superintendent of Rolling Stock of the New York Central & Hudson River RR., has accepted a position with the Gold Car Heating Co.

Dust guards, made by the Harrison Dust Guard Co., will be used on 1,000 cars of 80,000 lbs. capacity for the Hocking Valley and on 1,000 cars of 80,000 lbs. capacity for the Lake Shore & Michigan Southern now being built at the Michigan Peninsular works of the American Car and Foundry Co., and also on 125 cars of 40,000 lbs. capacity and on 125 cars of 60,000 lbs. capacity for the Michigan Central.

An order has been granted by the United States Court restraining Directors of the American Palace Car Co., of New Jersey, and the American Palace Car Co., of Maine, from disposing of any patent rights that it is claimed by the prosecutors belong to the Maine company. June 6 has been fixed for a hearing of the argument as to whether the restraining order shall be continued.

H. S. Mosher and J. I. Copeland, who are connected with the Chicago Pneumatic Tool Co., have sailed for Europe, to be gone three months in the interests of the company. These gentlemen have for some time past been operating pneumatic riveters at the works of the Chicago Ship Building Co., and they are going to Europe for the purpose of conducting some practical exhibitions of pneumatic riveting at several of the large shipbuilding yards in England and Scotland.

It is stated that the Sheffield Car Co., of Three Rivers, Mich., is about to engage in the making of electrical dynamos and motors.

The Columbus, New Albany & Johnstown Traction Co., 6 North High St., Columbus, O., will want bids on rails about July 1. L. P. Stephens is Manager and Purchasing Agent. The road is now being surveyed and will be built this summer.

The Tubular Despatch Co., owning and operating the pneumatic mail transmission tubes in New York City, has placed an order for three duplex Corliss air compressors, to be put in the Metropolitan Life Insurance Building, with the Pneumatic Supply & Equipment Co. of New York, recently organized to install complete compressed air plants. The capacity of each compressor is in excess of 1,300 cubic feet of free air a minute.

New Stations and Shops.

Ground has been broken for the new slip for the Illinois Steel Co. at South Chicago, which was noted in our issue of last week. It will be built of concrete, and when completed will about double the present ore handling capacity at the South Chicago mills.

Contract has been let by the McReynolds Elevator Co., of South Chicago, to the Botsford-Jenks Co., of Port Huron, for a new grain elevator to hold 1,500,000 bushels, and to cost about $300,000. It will be located in the Calumet region, at One Hundred and Sixth street and the river, and will have all the latest improvements. The work is to be completed in time for the fall grain trade.

Bids are asked by City Electrician Ellicott, of Chicago, on a new electric lighting plant at Sixty-fourth street and Wentworth avenue, work to be begun within one month. The plant will have a capacity of 2,000 lights and the estimated cost is about $150,000 complete. It will be known as the Robert A. Waller Municipal Lighting Plant, in honor of the late City Comptroller, who was the foremost advocate of its erection.

Ground has been broken for a new brick and stone freight house for the Chicago & Northwestern, at Boonton, Iowa.

The Wisconsin Central freight house in Chicago was burned down on the evening of May 28 and merchandise to the value of about $40,000 was destroyed by fire and water. The building was owned by the Chicago Terminal Transfer Co.. It was about 300 ft. long and one story high.

Coal Fuel.

The Boston & Maine is now using coke in the locomotive of a passenger train running between Boston and Rockport, Mass. A number of other engines will be fitted to use the same kind of fuel.

A Rail Mill Record.

For some time past the rail mill of the Illinois Steel Co., at South Chicago, has claimed the world's record for a day's run of rails, being 1,301 tons in 12 hours. Recently a night shift at the same mill rolled 1,310 tons of rails, of standard section, varying from 60 to 80 lbs. per yd. This was done in the ordinary course of business and no special preparations were made for the unusual run. In our issue of Nov. 11 last, p. 816, we noted the large output from these mills in the previous month; at that time a day and night shift turned out 3,004 tons of Bessemer finished steel at South Chicago, including billets, rails and plates, but not ingots.

Sale of the Pottsville Iron & Steel Co.

Application will be made June 12, to the Court of Common Pleas, Schuylkill County, Pa., to have Receiver William Atkins (formerly President) of the Pottsville Iron & Steel Co., sell all the property, franchises, etc., of that company at auction July 5, at the company's office, in Pottsville, Pa. The plant was built in 1852 to make rails, and was rebuilt in 1872. The sale is made on account of default of mortgages of January, 1871, to James H. Campbell, and of May, 1892, to the Safe Deposit Bank, of Pottsville. There are 12 heating furnaces and four trains of rolls (one 12, two 19, and one 23-in.). The annual capacity in iron and steel beams, channels, angles, tees, bars and shafting, is 35,000 gross tons. The steel department contains two 20-gross-ton basic open-hearth furnaces, whch were built in 1890.

The Westinghouse Air Brake in Europe.

It is not necessary to remind the readers of the Railroad Gazette of the fact that very much the greatest number of air brakes in use in the United States have been turned out from the Westinghouse shops. It is estimated that there are in the country about 1,100,000 freight cars which are equipped with air brakes, or will be. This, of course, does not cover the whole number of freight cars running in the country, but of these many will never have air brakes. Up to to-day the Westinghouse people have probably equipped about 800,000 freight cars, or more than three-fourths of those cars now built which are likely to be fitted with air brakes. The contracts for future delivery now in the hands of the Westinghouse Air Brake Co. are enough to fit a very large percentage of the freight equipment remaining. Obviously, the foreign field is now of great importance to the company.

For several years the Westinghouse Brake Co., Limited, has been established in London, Paris and Hanover, and a couple of years ago Westinghouse works were built at Hamilton, Can.

An important step forward is the decision of the Government railroads of Russia to use the Westinghouse brake, and an air brake company, the Société Anonyme Westinghouse, has been established and is now building a plant in St. Petersburg. Contracts have been placed by the Russian Government with this new Westinghouse company for $2,000,000 worth of apparatus, and larger contracts will follow.

The Maintenance of Way Association.

Mr. J. F. Wallace, President, and Mr. L. C. Fritch, Secretary of the American Railway Engineering and Maintenance of Way Association, have issued a circular dated May 15 giving an outline of committee work and standing committees. Members of the Association are invited to examine this circular and criticise it and make suggestions of topics, or methods of work, or of the names of chairmen of committees. Fifteen committees are suggested covering grading, roadbed and track, buildings, bridges, crossings, fences, etc., signaling and interlocking records and accounts, standard rules, water service, yards and terminals. Under each of these committees a careful synopsis is given of the topics which it is supposed they might profitably consider.

Bids Wanted on Government Jetty Work.

Sealed proposals for building jetties, etc., at Coquille River, Ore., for building jetty, etc., at Siuslaw River, Ore., and for building jetty, etc., at Coos Bay, Ore., will be received at the U. S. Engineer's Office, Portland, Ore., until 12 o'clock noon, July 25. Information on application. Wm. M. Harts, Captain of Engineers.

THE SCRAP HEAP.

Notes.

It is announced that the Wabash will oil its roadbed between Buffalo and Detroit.

The Legislature of Pennsylvania, at its session of this year, passed only one general law affecting railroads. This law is House Bill No. 379 (P. L. No. 120); it requires certain corporations, including railroads and street railroads, to pay to the State Treasurer one-third of one per cent. on the authorized capital stock, at the time of organization. The provision applies also in increases of capital stock by companies already formed. Section 2 gives general authority to existing corporations to increase their capital stock by a majority vote of stockholders.

Press despatches from Montreal and Ottawa state that the movement for the establishment of a railroad commission in Canada, which was started several months ago, has now gained considerable strength and that a bill for the appointment of a commission will be pressed in Parliament. The advocates of the bill say that the Canadian Pacific maintains exorbitant rates for the transportation of freight and that it secures new subsidies too easily. A recent considerable advance in the price of the stock of this road constitutes one of the principal incentives to the present agitation.

Press despatches from Montreal report that the Canadian Pacific has definitely concluded to put on a through express train, which will run between Montreal and Vancouver, 2,906 miles, in about 100 hours. The train is to be called the "Imperial Limited," and it will be put on about June 18. This train will run every day in the week, and the present through train will also continue in service.

The Western Union Telegraph Co. is contesting the validity of the law of Kansas which requires all telegraph companies to reduce their rates for telegrams within that State to 15 cents for 10 words and one cent for each additional word. The law was passed by the Populist Legislature, a few months ago, in connection with the establishment of the State Court of Visitation, which took the place of the former railroad commission. The telegraph company challenges the constitutionality of the law creating the Court of Visitation, and also avers that the 15-cent rate is not sufficient to pay expenses.

The Attorney General of Wisconsin holds that the law of that State, recently enacted, forbidding State officers to ride free on railroads, will make it illegal for the State Railroad Commissioner to ride free over the Burlington road from Chicago to Denver. The Burlington has invited all State Railroad Commissioners to take a free ride over its line from Chicago to Denver in August on the occasion of the National Convention of Railroad Commissioners; and, if we may believe the press despatches, the Attorney General holds that the Wisconsin commissioner cannot ride on this special train even if he pays his fare!

By the final decree in the quo warranto proceedings at Chicago the Circuit Court has given Pullman's Palace Car Co. five years to dispose of the residences, lots, streets, parks, gas, water and sewerage works, the hotel, churches, theatre and arcade building at the village of Pullman, and within one year it must cease to exercise municipal functions, in which the city of Chicago will take its place. The Pullman Co. will keep the car shops and adjoining ground, its office building and 75 acres of land for extension purposes.

The Cape-to-Cairo Railroad.

The Bechuanaland Railway Co. is advertising for subscriptions for a loan for the northward extension of the railroad from Bulawayo to a point near Lake Tanganyika. The length of the first section of this extension will be approximately 150 miles. The line reached Bechuanaland, Oct. 19, 1897, and the formal opening took place Nov. 4 of that year. The extension now proposed will tap important gold fields. Subscriptions are invited for 3¼ million pounds sterling at 4%, which sum, it is estimated, will carry the line to the northern boundary of the British South Africa Company's territories.

Tree Culture in Kansas.

About 17 years ago the Kansas City, Fort Scott & Memphis established the Farlington tree plantation in Crawford County, Kansas, and Mr. D. C. Burson, of Kansas City, has recently published in the Topeka Capital an interesting account of the present condition of the enterprise. The railroad company acted under the guidance of Prof. Sargeant, of Harvard University, planting a number of acres in white ash, wild cherry, alanthus, black walnut, osage orange and catalpa. The catalpa proving the most satisfactory, a number of large tracts were subsequently planted with that variety alone. For the last 14 years these tree plantations have received little attention, except that some thinning has been

done, and now there are 500 acres of forest as the result of the undertaking. In some parts of the plantation the soil proved unfavorable, but in others it was exceptionally good, and trees may now be seen of 10 to 12 in. in diameter and 40 to 50 ft. high; and there are from 1,500 to 1,800 trees on every acre. Some of the trees are quite 15 in. in diameter, and Mr. Burson estimates that 500 good telegraph poles could be cut on an acre in the best part of the plantation. The number of trees originally planted was about 2,700 to the acre; to-day they will average perhaps 2,000 to the acre, or 1,000,000 trees in all; and the million will average seven inches in diameter. Further thinning out is needed, and it is estimated that if this were properly done it would produce 25,000 telegraph poles and 500,000 fence posts, which would be enough to defray all the expenses thus far incurred on the plantation. After the thinning the remaining trees would grow faster; and from now on it is likely that ten or fifteen thousand dollars' worth of timber could be taken off annually. These timber lands are now under the care of Mr. Kessler, landscape architect of the road.

Taxation of Street Franchises in New York.

The New York law providing for the taxation of certain public franchises as real estate has finally been passed by the Legislature, sitting in special session, and has been signed by the Governor. The main provision is, as heretofore reported, in the Railroad Gazette, the term "real estate," as used in the tax law, is made to include the value of all franchises or rights in, under, above, on or through streets, highways or public places, and includes the franchises not only of railroads, but of companies which own or operate pipes, wires, conduits, etc. Additonal paragraphs were attached to the bill at the special session, giving the authority to assess these "special franchises" to the State Board of Tax Commissioners, thus taking it out of the hands of local assessors; but the State Board reports its valuations to the local boards, and the taxes are collected by each city or town for itself. The State Board, in making up the valuation is to include both the tangible property and the franchise connected with it, so that in the case, for instance, of a street railroad, local assessors will have nothing to say concerning the valuation either of the track or of the right to use it. The State Board is to give hearings at Albany after making a valuation, but before finally reporting it to the local assessors. An assessment may be reviewed by the courts. From the franchise tax as based on the valuation made by the State Board are to be deducted any and all taxes paid by the corporation to the city or town in the preceding year, such as license fees, gross earnings, taxes, etc., but not including money paid for paving or repairing streets. No deduction or credit shall be given for a greater sum than the amount of the special franchise tax. Other taxes are not to be affected by the new tax, and the tangible property shall not be taxable except on the assessment based on the State Board's valuation.

The new law goes into effect Oct. 1 next. It is quite generally assumed that in administering this law the assessors will be guided by the market value of the stocks and bonds of a corporation.

Cramps' Ship Building Co.

The annual meeting of the William Cramp & Sons' Ship and Engine Building Co. was held the 25th. The old Directors were re-elected, with the exception of Ernst Thalman, of New York, whose place was taken by Edwin S. Cramp. The annual report showed that the total gross earnings from all sources were in excess of $5,300,000, and the net earnings, $707,832, an increase over last year of $133,991. The net earnings applicable to dividends were $400,067, out of which two quarterly dividends were paid, amounting to $121,200, leaving a surplus of $287,867. At a meeting of the Directors Charles H. Cramp was elected President; Henry W. Cramp, Vice-President, and Charles T. Taylor, Secretary.

Passenger Train Wreck at Waterloo, Ia.

The northbound through passenger train of the Burlington, Cedar Rapids & Northern was derailed by a washout on the morning of May 28, about one o'clock, at the crossing of Sink Creek, near Waterloo, Ia., and the whole train was piled up in a bad wreck. Seven passengers and two trainmen were killed and 23 persons were injured. It is said that the washout was due to a cloudburst. On the same night a passenger train of the Chicago Great Western was derailed near Oelwein, Ia., and the sleeping car porter was killed. The derailment appears to have been due to a cause similar to that which produced the Waterloo wreck.

Sleeping Cars in the Middle.

It has been reported in the newspapers that the through night express trains of the Chicago, Rock Island & Pacific between Chicago and Kansas City are now made up with the sleeping cars next to the engine. This is not correct, but it is true that the day cars and the smoking car are now placed at the rear of the train and the sleeping cars next in front of these. Between the sleeping cars and the engine is the composite car, in which there is the baggage room and a smoking room, as well as a library and buffet. This arrangement of cars was adopted to enable sleeping-car passengers to pass to and from the composite car without going through the day cars, and we understand that it has proved satisfactory thus far. The station platforms were lengthened, where necessary, to accommodate the day cars at the rear of the train.

Liability of Sleeping Car Companies.

The appellate term of the Supreme Court of New York has decided, in the suit of Williams against the Wagner Palace Car Co., that a verdict against the company for $1,250, being the amount of money stolen from a passenger on a sleeping car, is excessive, and a new trial is ordered. The Lower Court is directed to take evidence with a view to showing how much money the passenger ought reasonably to have taken with him for the purpose of his journey, this being the measure of the damages to which he is entitled. The decision, by Justice Leventritt, says: "The ground of liability rests simply and solely in negligence. The very powerlessness of the passenger, and the impossibility of his retaining manual control or possession of his wearing apparel, valuables, or money, while asleep, imposes the duty of active watchfulness on the car proprietor, for the violation of which the law will compel it to respond in damages. A contract for the sale of a berth ticket involves the implied invitation to sleep, and, reasonably, the implied agreement to guard property from depredations by theft, by the exercise of a degree of vigilance commensurate with the danger to which the passenger is exposed. A sleeping car company is bound to maintain a reasonable watch during the night while the passenger is asleep, or using the necessary conveniences of the car, and it is bound so to manage its car as not unreasonably to expose his property to an unusual risk of loss by thieves or otherwise." The court holds that there was sufficient evidence of negligence to raise a question of fact for the jury whether or not the defendant was remiss in his duty to the plaintiff. The jury believed the plaintiff, and though the verdict should have been set aside as excessive, it was for the jury, under the circumstances, to say what portion, if any, of the $1,250 was required by the passenger to complete his journey to Boston, and therefore in what sum the defendant was liable.

A Bridge Contract in Dispute.

In the suit of the La Fayette Bridge Co. against the city of Streator, Ill., to recover $40,000 damages on account of the failure of that city to pay for a bridge, Judge Allen, in the U. S. Circuit Court, overruled the demurrer of the bridge company to the pleas of the defendant, and has given authority to the city to bring the matter to trial on the issues named in the pleas of the city. The bridge in question was contracted for Sept. 4, 1897, and finished Aug. 13, 1898, the contract price being $24,800. The bridge was opened to traffic, but the city of Streator failed to accept or pay for it, on the ground that the La Fayette Bridge Co. had entered into an unlawful agreement with the Chicago Bridge and Iron Co. for fixing and controlling the prices of iron and steel bridges in the State, which the city of Streator claimed was in violation of the anti-trust laws of Illinois. The other companies bid $42,000 each on the bridge and the La Fayette Co. secured the work at $24,800, which the city claims is too costly. The defendant city also claimed that some of its aldermen were bribed by the bridge company.

Raising a Bridge.

The Chicago & Northwestern bridge over the North Branch of the Chicago River between Claybourn Junction and Deering was elevated another 5 ft. on May 28. The work was commenced on Sunday, May 21, when the bridge was elevated the first 5 ft. The work was done by floating the bridge on scows, from which the water was pumped out until the bridge was raised the necessary amount, when a girder was placed under it. The work was done in connection with the track elevation, and both Sundays trains over the Evanston Division were run by way of Mayfair.

The Material Orders of the St. L., P. & N.

Under the merging of the St. Louis, Peoria & Northern with the Chicago & Alton, all the rails and rolling equipment ordered during the last few months by the St. Louis, Peoria & Northern will be delivered to the Chicago & Alton for the use of the latter road.

The "Kalor" Fuel Saving Compound.

Prof. Carpenter of Cornell writes to us: "My attention has been called to the fact that I am represented in an advertising circular as certifying to the excellence of a fuel saving compound called 'Kalor,' made by the National Fuel Compound Co. of Boston, Mass. I have never made a test of the compound known as 'Kalor,' nor did I ever hear of the material until the testimonial above referred to was called to my attention by the manager of the Raleigh Electric Co., Raleigh, N. C. A letter of mine is published which has no reference to 'Kalor,' but did have reference to another compound which at the time was called 'S. C. (394) Compound.' I was engaged by a disinterested third person to make a series of boiler tests during the year 1892 with and without the latter compound in such a manner as to determine its value, and was requested to write to a third person the results of the test as made from time to time. The letter published is a copy of one written during the progress of the trials for information of said third person, and the tests to which it refers were those in progress at the time. The trials quoted did show an apparent, although slight, advantage due to using the compound. The compound was applied by putting it in solution and applying it to the coal. Other trials were made, and it was found that equally as good results could be obtained by slightly dampening the coal without the use of 'S. C. (394),' as with it. The final conclusion of our entire series of trials was that the compound 'S. C. (394)' was absolutely worthless as a fuel, further than all the gain which was caused by its use in some cases was due to the applied water or to the method of handling the fire. The writer knows nothing in regard to Kalor, nor does he know anything in relation to the National Fuel Compound Co., but he does know that the letter in question was never written for the purpose for which it is used, and consequently that its use in such a manner must tend to deceive the public. If the compound is the same as the compound investigated in 1892, the writer does not hesitate to say that he believes it entirely worthless as a means of improving the calorific value of fuel."

Electric Exposition in Chicago.

The National Exposition of Electrical Arts Co., recently incorporated in Illinois, proposes to hold an electrical exposition at Tattersall's Building, Chicago, from Sept. 25 to Oct. 9, just previous to the Street Railway Convention, Oct. 17. It is proposed to have the exhibition cover a wide range, from cooking by electricity to electric vehicles, and to give demonstrations of liquid air, wireless telegraphy, the Nernst lamp and the X-ray. Special attention will also be given to illuminations. Mr. W. E. Burnham is Treasurer and Manager of the company.

A New Liner for Manchester.

The Palmer Shipbuilding & Iron Co. recently launched a screw cattle and cargo steamer named the "Manchester Port," for the Manchester liners, limited. The ship is intended for service through the Manchester Ship Canal to Canada. She is 467 ft. long, 52 ft. beam and 39 ft. deep. Her topmasts and funnel are telescopic to go under the canal bridges. This will be the largest ship that has yet used the canal. Her displacement is about 14,500 tons. The engines are to be triple-expansion, the cylinders being 30 in., 50 in. and 82½ in. x 54 in. stroke.

Additional Power for the Metropolitan Elevated.

Two direct-connected generator units are being installed in the addition to the power house of the Metropolitan West Side Elevated, Chicago, that will be larger than any similar machines in that city. They are Allis vertical compound-condensing engines and General Electric 600-volt dynamos, all of the latest design. The parts were made and assembled at the shops at Milwaukee and Schenectady and shipped to Chicago, where they are now being erected. One of the sets is now partly set up and will be in operation in about six weeks. Each engine is 31 ft. high above the floor level, the flywheel extending 9 ft. below it, making the vertical dimension of the unit 40 ft. The cylinders are vertical 38 in. x 76 in. x 48 in. and will be placed on each side of the flywheel and generator. Each generating set occupies 38 ft. x 24 ft. of floor space. The flywheel is 24½ ft. in diameter and weighs 160,000 lbs. in the rim. The shaft with armature spider and disks weighs 54 tons. The engines are rated at 2,250 h. p. each and will be run at 75 revolutions a minute with a steam pressure of 160 lbs. There are two governors, one on each cylinder, and double-ported valves are used on both high and low pressure cylinders. The generator has 18 poles and a nominal capacity of 1,600 k. w. The armature is 10 ft. in diameter. The magnet frame is of cast steel and strengthened by heavy ribs. Each of the units has a jet condenser having a steam cylinder 16 in. x 42 in. with Reynolds-Corliss valve gear. Including the extension the power house is about 600 ft. long and is divided into engine and boiler rooms by a longitudinal brick wall. Six Babcock & Wilcox water tube boilers of about 600 h. p. each are being added to the plant. The older generating equipment consists of two 1,500 k. w. and two 800 k. w. machines and including the present additions the station will have a capacity of 7,800 k. w. which is needed, as the power house has been overloaded 60 or 70 per cent. at times during rush hours.—Western Electrician.

Fish by Rail.

A recent Parliamentary document shows the amount of fish carried by rail in the United Kingdom, dealing with each of the principal ports. The amount carried in the year 1898 from the ports of England and Wales was 371,285 tons; from the ports of Scotland, 101,135 tons, and from the ports of Ireland, 14,364 tons. The total was 486,784 tons.

Correspondence School.

W. B. Huskey, formerly with the Correspondence School of Locomotive Engineers and Firemen, has been appointed Superintendent of the Railroad Department of the International Correspondence Schools, of Scranton, Pa., with headquarters at 201-207 Monadnadnock Block, Chicago.

New York Central Grain Elevator.

The change in the plans of the New York Central by which grain and other freight handled in large quantities is to be delivered at New York on the west side of the river instead of the east side was noted in the Railroad Gazette of May 5, page 317. It is now announced that the company will proceed at once with plans for a grain elevator at Weehawken to hold 3,000,000 bushels. The piers and sheds for handling package freight at Weehawken will also be enlarged. The grain elevator will adjoin deep water slips so that ocean steamships can be loaded directly from the bins.

Why Hadley is President of Yale.

"The public prominence of the young instructor began with the days of his tutorship, when railroad questions, in both their civic and their economic bearings, commanded his attention. By systematic study, in a relatively short time he made himself an authority on them, and, ere long, a high authority, specializing somewhat on railroad matters in Europe, but his work ranging through the whole subject—operation, finance, mechanics, rates, competition, and, in particular, the relations of railroads to the State. It was during this period that, as an associate editor of the Railroad Gazette under . . . . he came into closer touch with a brach of study in which he never lost interest and which he has regularly introduced as subject-matter for his classrooms. The Bibliography of Yale Professors shows that down to 1893 out of twenty-nine volumes and articles penned by Prof. Hadley practically all related to railroads and transportation problems. As early as 1883 he contributed a series of articles on 'Transportation' to 'Lalor's Cyclopedia of Political Science,' and in 1886 he prepared part of the article on 'Railways' in the 'Encyclopedia Britannica,' having a year before publishad through the Putnams a volume entitled 'Railroad Transportation; Its History and Laws,' of which there have been one translation in France and two in Russia. On financial subjects he has of late years become almost as high an authority as on railroads."—"C. D." in the N. Y. Evening Post.

Steamer Chapin of the New Haven Steamboat Co.

The new steamship Chester W. Chapin, of the New Haven Steamboat Co., which is being built at the Sparrow Point yards of the Maryland Steel Co., will be 324 ft. on deck, 310 ft. water line, 64 ft. breadth over guards and have a speed of 21½ statute miles an hour. The Chapin will take the place of the Richard Peck when the latter goes in service on the proposed new line between Providence and New York. The new boat will be driven by two triple expansion engines. It will be 10 ft. longer than the Peck and have cabins continued aft on the galley deck.

The Central and Mr. Buchanan.

The following resolution, adopted by the directors of the New York Central Railroad, has been engrossed for presentation to Mr. William Buchanan, late Superintendent of Motive Power and Rolling Stock, after a continuous service with the company of 52 years:

"For more than a quarter of a century Mr. Buchanan has been the recognized leader among the railroad men of the United States in his specialty. Many of the remarkable improvements in the power of locomotives and their ability to haul increasing weight of trains have been his suggestions, and all of them are the result of expert and able sifting of hundreds of inventions at his hands. The railroads owe much to him for those reductions in the cost of operation by which they have been enabled to survive the constant lowering of rates.

"He never had any difficulties with the engineers or firemen, but retained through all the labor troubles which occurred during his long service as Superintendent of Motive Power the loyalty, friendship and cordial support of every man subject to his authority. He has enjoyed the absolute confidence of every administration, and it has been the pleasure of each president to bear testimony to his successor to the intelligence, integrity and great value to the company, in the shops and on the road, of this upright and able officer. He carries with him in his retirement the friendship of us all, and our

best wishes for the full enjoyment of many years of health and happiness."

Long Run of a Horseless Carriage.

On Monday morning of last week there started from Cleveland, O., a horseless carriage designed by Mr. Alexander Winton, which run to New York, a distance by the cyclometer on the vehicle, of 707.4 miles, arriving in the latter place Saturday evening at 5.45 p. m. The total running time was 47 hours and 34 minutes, thus making the average speed 14.9 miles an hour. The breaking of an axle on the second day delayed the carriage somewhat. It is of interest to note that the gasoline used on the trip cost about $1, and the wear and tear on the machine during the trip was calculated at less than ¼ of one per cent. This raises an interesting question as to the economy of the gasoline motor carriage, and it is safe to say that, other things being equal, gasoline has an advantage over electricity or compressed air. One of the difficulties heretofore has been in starting easily, while another, and the principal objection, has been due to the unpleasant odor from the engine. These difficulties, in some cases, have been overcome, and the horseless carriage driven by gasoline will appeal to users not only because of its economy of working, but also on account of the ease of obtaining the source of power.

Last week, after the run, Mr. Winton made a challenge to "all the world" for an automobile race and according to the New York Herald of Tuesday, M. Charron, the winner in the Paris-Bordeaux race, announces he is ready to accept it, the contest to take place preferably in France.

Technical Schools.

Armour Institute of Technology.—The technical college and scientific academy, which have been under one dean, have now been separated into distinct departments. Victor C. Alderson, professor of mathematics, has been appointed dean of the technical department, to take the place of the late Thomas C. Roney, and Prof. Louis C. Monin has been appointed dean of the scientific academy. A department of civil engineering has been added for which a prospectus has been issued. Prof. Alfred E. Phillips, formerly of Purdue University, will be in charge of this department.

Lehigh University.—The summer school of the University opens July 5 and closes August 16. Special courses have been arranged in civil, mechanical and electrical engineering and in the departments of chemistry, mathematics, English and languages. A prospectus of the work can be obtained from the President. Among the subjects of the theses of the graduating classes are the following: In civil engineering, "Investigation of the Stability of Six Masonry Dams near Scranton, Pa.," by George R. Jackson; "Comparison of Interlocking Systems for Railroad Switches and Signals," by Percy L. Reed; "Description, Discussion and Comparison of Railroad Frogs Within Three Miles of Lehigh University," by Victor H. Reid. In mechanical engineering, "American Locomotive Link and Valve Motions," by Russell Kimball; "The Efficiency and Practical Value of American Wind Engines," by Mr. H. Henry R. Palmer; "Design of a Rope Transmission for the Carpenter Steel Works of Reading, Pa.," by George H. Wood. In electrical engineering, "Critical Study of the Operating Conditions of the Allentown-Bethlehem Electric Ry.," by Owen G. MacKnight; "A New Method of Multiplex Telegraphy," by John S. Viehe. The calendar of the University week announces that Class day will be held Monday, June 12, Alumni day June 13, University day June 14, at which time will be held the commencement exercises, with orations by members of the graduating class and addresses by Hon. Rufus King Polk and the Rt. Rev. Ethelbert Talbot.

Rensselaer Polytechnic.—The 75th anniversary of the foundation of the Rensselaer Polytechnic Institute will be celebrated at the coming Commencement, June 13 and 14. On Tuesday there will be an excursion by special train to Schenectady to visit the plants of the General Electric Company and of the Schenectady Locomotive Works. Lunch will be served at Schenectady and in the evening an Alumni dinner will take place at Troy. On Wednesday a business meeting of the Alumni will take place in the morning, followed by a lunch at the Troy Club. In the afternoon there will be an excursion by special cars to the Watervliet Arsenal, where a jacket will be shrunk on one of the big guns now being built. The Commencement exercises will take place at Music Hall in the evening. Captain Taylor, of the United States Navy, whose son will be graduated this year, will deliver the commencement address. There will afterwards be a public reception given by the Alumni Association to friends of the Institute. Many classes will hold reunions during the celebration of the anniversary.

Purdue University.—The closing lecture in the course of special railroad lectures at Purdue University was given on May 2 by Hon. D. P. Baldwin, of Logansport. Ind. Judge Baldwin, who is a close student of economics, took for his subject, "Railroad Prejudices," treating the subject from the standpoint of the general public. He gave the history and causes for the prejudices which very generally exist in the public mind against railroads, showing that these prejudices were in the beginning well founded, but that in later years conditions materially changed and that methods of railroad management and operation were no longer subject to the abuses which held in former years. The subject was ably handled and the case of the people was stated with fairness and impartiality.

Sibley College of Mechanical Engineering, Cornell University.—Prof. H. Wade Hibbard, A. B. M. E., Principal of the School of Railway Mechanical Engineering, has issued a small pamphlet giving some particulars of the summer vacation work in railroad and locomotive shops, as a supplement to and preparation for courses in the new department of railroad work at Cornell. The announcement is made that arrangements have been completed with some locomotive builders and superintendents of motive power to take the students of this school into the shop for the long summer vacation at good wages for the character of the work done. This will enable students after three years or less of theoretical study to obtain a short practical course in the shops and on the road. Besides the branches included under the heading of rolling stock and of railroading itself, Prof. Hibbard calls attention to the demands for technical graduates as supplymen for large business houses and directs attention to the value to students who may thus be employed of spending as much time as possible in the different departments of railroads.

LOCOMOTIVE BUILDING.

The Indiana, Illinois & Iowa will probably order engines this week.

The Lake Shore & Michigan Southern is reported to be in the market for fifteen passenger locomotives.

The East Tennessee Lumber and Mining Railroad Co., which is to build a new road, will require three engines. It is not known when bids will be asked. (See Railroad Construction column.)

The Southern Railway has recently ordered four 10-wheel passenger engines from the Schenectady Locomotive Works; four 10-wheel passenger engines and eight consolidations from the Richmond Locomotive and Machine Works, and seven consolidation from Pittsburgh Locomotive Works. Of the 10-wheel passenger engines, part will have 20x26-in. cylinders, with 110,000 lbs. on drivers, the total weight being 145,000 lbs., and diameter of the driver 68 in. over tires, the number of tubes being 267, having an outside diameter of 2 in., and being 14 ft. 6 in. long. The balance will have 21x28-in. cylinders, will weigh 156,000 lbs., with 117,000 lbs. on drivers, will have drivers 72 in. over tires, and will have 295 tubes with an outside diameter of 2 in., being 15 ft. 5¼ in. long. All the 10-wheel passenger engines will have wagon-top radial stay boilers, a working steam pressure of 200 lbs., National Tube Works' iron tubes, Carbon steel fireboxes, 120 in. long and 42 in. wide, and the tank capacity for water will be 5,000 gals., and for coal eight to nine tons. They will have Westinghouse air brakes on all drivers, Coffin process steel axles, Heigenbottom bell ringers, Sterlingworth brake beams, Ross-Meehan brake shoes, Janney couplers, Pyle National electric headlights, Monitor injectors, U. S. Metallic valve and piston-rod packings, Coale muffled safety valves, Leach sanding devices, Nathan triple-sight feed lubricators, National springs, Crosby steam gages, Latrobe tires on driving wheels, truck wheels and tender wheels; cast iron steel centers and McIntosh blow-off cocks. The consolidation locomotives are for September delivery, and will weigh 158,000 lbs., with 139,000 lbs. on drivers. They will have 21x28-in. cylinders; the diameter of drivers will be 60 in. over tires; they will have wagon-top type radial stay boilers; working steam pressure 200 lbs.; 271 National Tube Works' iron tubes, 2 in. outside diameter and 14ft. 3 in. long; fireboxes, 103 in. long and 42 in. wide, of Carbon steel; tank capacity for water, 5,000 gals., and coal capacity, eight to nine tons. The special equipment will be the same as that for the 10-wheel passenger engines, except that Star headlights will be used. They will not have steam heating equipment, and the tender wheels will be cast iron chilled.

CAR BUILDING.

The rumor that the Cleveland, Canton & Southern will order new cars is revived.

The Pressed Steel Car Co. has just shipped the 100 steel cars ordered by the Egyptian State Railroad.

The Wheeling & Lake Erie car order has been laid aside until the next Directors' meeting, which will be held in June.

The New York, New Haven & Hartford has ordered 250 of the cars referred to in our issue of April 21 from the American Car & Foundry Co.

The East Tennessee Lumber and Mining Railroad Co., which is to build a new road, will require 60 cars. It is not known when bids will be asked. (See Railroad Construction column.)

The Midland Terminal has placed the order for 200 box cars, noted in this column May 19, with the American Car & Foundry Co., the cars to be built at the Missouri Car & Foundry Co. works.

President Robinson, of the Mexican Central, informs us that the subject of new equipment is now under discussion, but no decision as to whether or not purchases will be made has been reached.

Pullman's Palace Car Co. is understood to have submitted prices on some passenger cars for the Bogota & Magdalena Ry., of the Republic of Columbia, S. A.; and it is understood that other builders have been asked by the same company for bids on a miscellaneous lot of from 100 to 150 freight cars.

The 250 cars ordered by the Southern Indiana from the Barney & Smith Car Co., as noted in our issue of last week, are for October delivery. They will be coal cars of 60,000 lbs. capacity, 34 ft. long and 8 ft. 9 in. wide. They will be equipped with Westinghouse air brakes, Hein couplers, French springs, Morris journal box lids, rigid diamond trucks with 33 in. wheels, steel axles and wooden bolsters.

Under the new arrangement between the Chicago & Alton and the St. Louis, Peoria & Northern, the 1,000 box cars ordered from the Mt. Vernon Car Mfg. Co. and the 1,000 coal cars ordered from the Georgia Car Co. by the latter road, will go to the Chicago & Alton; but it can be announced with reasonable certainty that after the return of Mr. Harriman from Alaska, 60 or 90 days hence, an additional order for freight equipment will be placed by the Chicago & Alton.

We have recently noted the fact that the Southern was in the market for a miscellaneous lot of cars. The company has ordered 500 hopper bottom coal cars from the Lenoir Car Co., 500 box cars from the American Car & Foundry Co., 100 flat cars from the American Car & Foundry Co., 10 passenger cars from Pullman's Palace Car Co., three baggage and express cars from the Barney & Smith Car Co., and two postal cars from the American Car & Foundry Co. The coal cars will be of 60,000 lbs. capacity, will weigh 29,450 lbs., and will be 28 ft. long over end sills, 8 ft. wide over side sills, and 9 ft. 4 in. high from rail to top of car. They will have O. H. steel axles, Bettendorf bolsters, Sterlingworth brake beams, cast iron brake shoes, Westinghouse brakes, M. C. B. standard brasses, Buckeye couplers, Butler draft rigging, cast iron journal boxes, pressed steel M. C. B. journal box lids, the company's standard paint, National springs, company's standard channel trucks, cast iron wheels. The box cars will be of 60,000 lbs. capacity, will weigh 36,200 lbs., will be 34 ft. 6 in. long over end sills, 8 ft. 10 in. wide over side sills, and 12 ft. 8 in. high. They will have O. H. steel axles, Buckeye bolsters, Sterlingworth brake beams, cast iron brake shoes, Westinghouse brakes, company's M. C. B. standard brasses, Buckeye couplers, National Malleable Iron Co.'s door fastenings, Security doors, Butler drawbar attachments, company's standard cast iron journal boxes, pressed steel M. C. B. journal box lids, company's standard paint, Chicago metal roofs, National springs, Buckeye trucks, and 33-in. cast iron wheels. The flat cars will be of 60,000 lbs. capacity, will weigh 24,000 lbs., will be 40 ft. long over end sills, 8 ft. 10 in. wide over side sills and 4 ft. high from rail to top of floor. They will have O. H. steel axles, Buckeye bolsters, Sterlingworth brake beams, cast iron brake shoes, Westinghouse brakes, company's M. C. B. standard brasses Buckeye couplers, Butler drawbar attachments, cast iron journal boxes, pressed steel M. C. B. journal box lids, company's standard paint, National springs, Buckeye trucks and cast iron wheels. The passenger cars will be 57 ft. long over end sills, 9 ft. 8½ in. wide over side sills and 14 ft. 4 in. high over all; they will be of wood, with wood underframes, and have O. H. steel axles, company's standard wood bolsters, Sterlingworth brake beams, Diamond S brake shoes, Westinghouse brakes, Ajax metal brasses, Janney three-stem couplers, Pantasote curtains, Forsyth fixtures, Gold heating system, company's standard cast iron journal boxes, pressed steel M. C. B. journal box lids, Pintsch light, company's standard paint, Standard Coupler Co.'s steel platforms, canvas roofs, National springs, company's standard four-wheel trucks, Pullman vestibules, and 38-in. Taylor fused wheels. The baggage and express cars will be 61 ft. long over end sills, 9 ft. 8½ in. wide over side sills and 14 ft. 4 in. high over all. They will have O. H. steel axles, company's standard wood bolsters, Sterlingworth brake beams, Diamond S brake shoes, Westinghouse brakes, Ajax brasses, Janney three-stem couplers, company's standard cast iron journal boxes, pressed steel M. C. B. journal box lids, Pintsch light, company's standard paint, Standard Coupler Co.'s steel platforms, No. 6 canvas roofs, National springs, company's standard six-wheel trucks. Buhoup vestibules and 38-in. Taylor fused wheels. The postal cars will be 60 ft. long over end sills, 9 ft. 8½ in. wide over side sills, 14 ft. 4 in. high over all; they will be wood, with wood underframes, and have O. H. steel axles, company's standard wood bolsters, Sterlingworth brake beams, Diamond S brake shoes, Westinghouse brakes, Ajax brasses, Janney three-stem couplers, Gold heating system, company's standard cast iron journal boxes, pressed steel M. C. B. journal box lids, Pintsch light, company's standard paint, Standard Coupler Co.'s steel platforms, canvas roofs, National springs, company's standard six-wheel trucks, Buhoup vestibules and 38-in. Taylor fused wheels.

The Columbus, New Albany & Johnstown Traction Co., 6 North High St., Columbus, O., will want bids on rolling stock about July 1. L. P. Stephen is Manager and Purchasing Agent. The road is now being surveyed, and will be built this summer.

The Metropolitan West Side Elevated, of Chicago, has placed an order with the Barney & Smith Car Co. for the 18 motor cars mentioned in our issue of April 14. These are in addition to the 18 trailer cars ordered from the Harlan & Hollingsworth Co., and noted in our issue of May 19.

BRIDGE BUILDING.

ABERDEEN, WASH.—The bids received by the City Council May 18 for rebuilding the North Aberdeen bridge were: O. C. Vammen, $1,679; R. S. Jackson, $1,645; Puget Sound Dredge Co., $2,097; Savage & Schofield, $1,612; Creech Bros., $1,709, and the Northwestern Bridge Co., $1,687. All bids were rejected.

BINGHAMTON, N. Y.—The special bridge committee of the Council, May 23, reported the bids for the new Thompkins St. bridge as follows: Pittsburg Bridge Co., $46,204; Youngstown Bridge Co., $43,128; Toledo Bridge Co., $41,556; Elmira Bridge Co., $40,249; Brackett Bridge Co., $28,990; Owego Bridge Co., $36,461; Groton Bridge Co., $34,978. The Groton Bridge Co. got the contract.

BUFFALO, N. Y.—The sealed proposals which F. V. E. Vardol, Chief Engineer for the Grade Crossing Commission, will receive until June 3, are for building the superstructure for a viaduct over the New York, Chicago & St. Louis, the Western New York & Pennsylvania and the Buffalo Creek railroads, in Abbott Road.

The Elmira Bridge Co., according to report, has the contract for building the superstructures in grade crossing work over the Lake Shore & Michigan Southern and the Erie railroads at the Elk St. and Abbott Road viaducts, Buffalo. The contract price is $197,217, and the work is to be completed in six months.

CALIFORNIA, KY.—County Engineer E. E. Ball will receive proposals until 2 P. M., June 5, for building iron spans over Ten-Mile Creek and Phillips Creek. The length of spans are 24 and 36 ft., with roadways 12 ft. wide.

CAMDEN, N. J.—A new iron bridge, according to report, is contemplated in the Annex District, at Pavonia.

CAMPBELLTON, N. B.—The Restigouche & Western will build a bridge over the St. John River at St. Leonards. Messrs. Malcolm & Ross, contractors, St. Leonards, N. B.

CAPE MAY, N. J.—Plans and estimates are wanted by H. S. Rutherford, box 863, Cape May City, until 8 P. M., June 5, for a new steel bridge, 105 ft. long and 20 ft. wide, with and without a draw, to be built over Cape Island Creek.

CHAMBERSBURG, PA.—The Borough Committee has been authorized to ask for bids for a new bridge on North Second St.

CHICAGO, ILL.—The City Council, May 22, passed an order calling on the Commissioner of Public Works for plans and estimates of the cost of building a viaduct from Michigan Ave. and Randolph St., eastward, for 500 ft., and then northward across the Chicago River by a viaduct and a bascule bridge connecting with the south end of St. Clair St. The object is to connect the North and South Side boulevard systems, which improvement is greatly needed, various plans for it having been under discussion for several years. Four different routes have been

discussed, and it seems probable that the renewal of the agitation at this time may lead to practical results.

Representatives of the Chicago & Northwestern and the Chicago, Burlington & Quincy, according to report, have offered the Commissioner of Public Works sufficient money to build a viaduct over the railroad tracks at Canal St. They also ask that the West Chicago St. RR. Co. be required to furnish an additional $19,500, which, it is estimated, will be sufficient to make the viaduct strong enough for street car uses.

CLARKSBURG, W. VA.—The contract for the bridges on the West Virginia Short Line Railroad has been let to the Mountain State Construction Co., of West Virginia. J. V. Davis, Chief Engineer, 32 Nassau St., New York.

DAYTON, O.—The proposals which City Controller Robert H. Ferguson received on May 31 were for supplying material and building a steel girder bridge across the Miami and Erie Canal at Wayne Ave. The bridge will be a 40-ft. span, with single roadway 40 ft., and two sidewalks each 13 ft. wide.

EVERETT, WASH.—The County Commissioners are on a tour of inspection in the northern part of the county, where new roads are contemplated and which will require the building of several bridges.

FRANKFORT, IND.—The Commissioners of Clinton County want bids June 5 for 10 steel bridges, the longest span of which is 120 ft., across Gilmore Creek, near Hamilton. The other spans vary from 20 ft. to 80 ft long.

GENOA, NEB.—County Clerk G. W. Ellsworth will receive bids until June 16 for a steel bridge 60 or 70 ft. long across Beaver Creek, near Genoa.

GLENCOE, ILL.—Frank A. Windes, County Engineer Winnetka, Ill., will receive bids until 3 P. M., June 6, for grading and other work caused by building the subway under the Chicago & Northwestern Ry. at Glencoe.

HOLSTEIN, ONT.—Bids are wanted by D. Allez for building a steel bridge, with a 70-ft. span, at lot 18, concession 5, Egremont.

HULL, QUE.—A steel bridge, according to report, across Brigham's Creek, will be built at a cost of $7,000.

INDIANAPOLIS, IND.—The County Commissioners have let contracts for the four bridges mentioned May 5, p. 320: For the Bean Creek bridge, Churchman road, Robbins & Frazier, substructure, $6.75 a cu. yd.; the iron work, Lafayette Bridge Co., $586; Grassy Creek bridge, Brookville road, stone work, William Fife, $8.45 cu. yd.; iron, Lafayette Bridge Co., $1,575; Crooked Creek bridge, Cline road, stone work, William Fife, $7.90 a cu. yd.; iron work, Lafayette Bridge Co., $1,115. Bids for the iron work on the Little Eagle Creek bridge, Michigan road, were also received, and the contract went to the Lafayette Bridge Company for $1,710. The former bids for this work were rejected as being too high.

KANE, PA.—The Supreme Court has granted the Borough of Kane permission to issue bonds to the amount of $7,000 to build a new bridge across the P. & E. RR. tracks.

LEBANON, O.—Bids are wanted by June 19 for various work on bridges to be built over Cæsar's Creek and Dry Run. I. N. Walker is County Auditor.

LEWISBURG, PA.—The report of the viewers for the county bridge over Penn's Creek, in Hartley Township, has been approved by the Grand Jury.

MODESTO, CAL.—The County Surveyors of Stanislaus and San Joaquin Counties estimate the cost of the necessary repairs to the bridge across the Stanislaus River, near Ripan, at $2,000.

MONTCLAIR, N. J.—The Erie RR., according to report, has agreed with the North Jersey Traction Co. to eliminate the grade crossing on Valley Road, near Watchung. The steam railroad tracks will probably be raised.

NEW YORK, N. Y.—At a meeting of the Board of Estimate, May 25, $500,000 additional bonds were authorized for work on the new East River bridge.

NORWALK, O.—The City Council wants bids by June 20 for a viaduct on Linwood Ave. T. P. Kellogg, City Clerk. Bonds to the extent of $11,000 have been disposed of for this work.

OLD TOWN, MD.—The Commissioners of Allegany County, May 26, and the Commissioners of the Court of Hampshire County, W. Va., viewed the site of the proposed bridge over the Potomac River, at Old Town. The bridge, it is estimated, will cost about $10,000, and will supplant the ferry now in use.

OMAHA, NEB.—Again the Sixteenth St. viaduct has been condemned by the railroad companies and closed to traffic. Plans have been under consideration for some time to replace this structure. The contemplated viaduct is 1,600 ft. long, of steel, with a 30-ft. roadway, two sidewalks 10 ft. wide on both sides, and will be paved with asphalt on concrete over buckle plates. The work, it is said, will probably be done directly by the Union Pacific and C., B. & Q. railroad companies, who, under the provisions of the law, are required to keep the structure in good condition. The cost of the new work will probably be between $180,000 and $200,000. Andrew Rosewater, City Engineer.

PAINESVILLE, O.—Bids are asked until June 7 by the County Commissioners for a new bridge over the Grand River to Fairport, which was acted upon at the spring election in April. The bridge will be a steel truss structure 20 ft. wide. (Feb. 17, p. 130.) The County Commissioners on May 30 received bids for $35,000 of 4 per cent. bonds, part of which will be used for this structure.

PARIS, ONT.—According to report, tenders are wanted June 5 by S. Dadson, Town Clerk, for building a highway bridge on Dundas St.; length, 130 ft.

PENCOYD, PA.—James Riley, of Reading, according to report, has the contract for building a steel bridge across the Schuylkil River for the Wissahickon Bridge Co. The bridge will consist of three spans, two 150 ft. long and one 50 ft. long.

PETERSBURG, VA.—J. C. Munday & Co., Knoxville, Tenn., have received the contract for all the bridge masonry, embracing the James, Appomattox, Nottaway and Meherrin rivers; also for the pedestal masonry for the steel viaducts in Richmond and Petersburg, which will be built by the Richmond, Petersburg & Carolina RR. There will be altogether about 4,500 cu. yds of first and second class bridge masonry. C. H. McMichael, Chief Engineer.

PHILADELPHIA, PA.—Members of both branches of the Council, on May 26, viewed a site at Passyunk Ave. for building a new iron bridge over the Schuylkill River.

PITTSBURGH, PA.—The Coraopolis & Sewickley Bridge Co., which was incorporated in January, gives notice that application will soon be made for permission to build a bridge across the Ohio River at Chestnut St., Sewickley, 13 miles below Pittsburgh. L. L. Brock, Secretary, Pittsburgh, Pa. (Jan. 20, p. 52.)

The Consolidated Traction Co. will build a bridge over the Junction Railroad at 33d St. and Liberty St., as a result of a Supreme Court decision, forbidding the grade crossing.

PITTSTON, PA.—The Phœnix Bridge Co. has the contract for building the new bridge across the Susquehanna River at this place for the Delaware, Lackawanna & Western. Work will be begun by June 20. The present structure was built 50 years ago, when the Bloomsburg Division was built, and in 1875 a portion of the wooden structure was destroyed and rebuilt with iron. (Feb. 24, p. 146.)

PORTAGE LA PRAIRIE, MANITOBA.—The Manitoba Government, through the Hon. R. Watson, notified the Town Council that it will pay one-third of the cost of a bridge across the Assiniboine River at this place. The Council passed a motion to assume another third, and the Council of the Rural Municipality will assume the balance.

POTTSVILLE, PA.—A committee has been appointed to consider plans for the Race St. bridge.

RANDOLPH, UTAH.—A special election was held May 22 to submit the question of incurring a debt of $2,500 to build a bridge across Rear River, near the Marshall Ford, south of Sage Creek, on the road to Kemmerer, Wyo. John Kennedy, Chairman of the Board. M. McKinnon, County Clerk.

READING, PA.—The bridge which is to be built over the railroad tracks on Spring St., between Nicolls and Sixth Sts., and for which $65,000 has been appropriated, will be of two overhead spans, each 164 ft. long. It will also have 330 ft. of steel approach on 10-pier columns, and it is estimated that the superstructure will cost $45,000.

RICE, MINN.—According to report, a new steel bridge will be built across the Mississippi River at Rice, Benton County, at an estimated cost of $10,000. J. C. Mombury, Town Clerk. Reports also state that a bridge will be built across the river at Sauk Rapids, in the same county.

SANTA FE, N. M.—The Denver & Rio Grande bridge across the Chama, between Espanola and Chamita, was burned May 22. It was 288 ft. long and about 10 ft. high.

SODUS CENTER, N. Y.—The Town Board of Highway Commissioners are considering plans for a stone arch bridge over Salmon Creek, on Maple St.

STAMFORD, CONN.—Bids, according to report, will soon be wanted for a stone bridge at North St.

SUNBURY, PA.—According to report, plans are being considered for a bridge over the Susquehanna River to Snyder County. It has been estimated that a bridge at this place would cost between $72,000 and $100,000.

SYRACUSE, N. Y.—A resolution has been introduced in the City Council requiring the Syracuse Northern Ry. to build a bridge over the Erie Canal at Franklin St.

WALLA WALLA, WASH.—The bids for building a steel bridge across Mill Creek, on Fourth St., were opened May 20, and the Pacific Bridge Co., of Portland, Ore., was awarded the contract. The bids were: Portland Bridge Co., $2,585; Puget Sound Dredging Co., Gilbert Hunt Co., Agt., $3,250; Tweenden & Mills, Tacoma, $3,740; Wolff & Zwicker, Portland, $2,898; Sayels, Clark & Keefe, $3,356. (May 5, p. 321.)

WARRENTON, VA.—The Board of Supervisors have appropriated $2,000 for a new iron bridge over Cedar Run, at Weaversville.

WAUSAUKEE, WIS.—The Dunbar & Wausaukee RR. bridge over Pike River was destroyed by high water May 21. Two other bridges were washed away May 20, causing damage to the extent of $1,000.

WAXAHACHIE, TEX.—The Missouri, Kansas & Texas, according to report, is contemplating building a new steel bridge over a creek at this place to replace a structure on piling.

WHITINSVILLE, R. I.—The Directors of the Blackstone Valley Electric St. Ry. Co., according to report, have submitted plans to the city for a bridge across the Blackstone River and also for a trestle over the N. Y., N. H. & H.

WILKESBARRE, PA.—Plans have been submitted to the Board of Trade for the Pond Hole bridges. The plan provides for a bridge 225 ft. long, with four arches, over the Wilkesbarre Pond Hole, and another 124 ft. long, with two arches, over that at Kingston. Both bridges will be 21½ ft. above low water mark, and the estimated cost of both is $42,000. The plans were prepared by H. S. Smith.

A resolution was introduced in the Council May 23, to advertise for bids for building iron bridges over Solomon's Creek at Miller and Blackman Sts.

YREKA, CAL.—Robert Rankin, Clerk to the Board of Supervisors of Siskiyou County, will receive bids July 6 for building culverts and bridges on a new wagon road.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Delaware & Hudson.—Quarterly, 1¼ per cent., payable June 15.

Cleveland, Cincinnati, Chicago & St. Louis.—Quarterly, preferred, 1¼ per cent., payable July 20.

Chicago & Eastern Illinois.—Preferred, 1½ per cent., common 2 per cent, payable July 1.

Exeter (N. H.) St. Ry.—Quarterly, 1½ per cent., payable June 1.

Engineers' Club of Philadelphia.

A business meeting of the club will beld on Saturday, June 3, 1899, at 8 o'clock P. M. This will be the last stated meeting previous to the summer recess. The paper will be on "The Niagara Gorge Railroad," by George A. Ricker, Buffalo, N. Y.

Claim Agents.

The Association of Railway Claim Agents met in Buffalo, N. Y., May 23, 24 and 25. The officers elected for the ensuing year are: G. E. McCaughan (C. R. I. & P.), President; R. C. Richards (C. & N. W.), Vice-President, and J. H. Dockery (C. & N. W.), Secretary.

American Society of Civil Engineers.

At the meeting of the Board held May 2, meetings of Juniors were authorized for the second Wednesdays of May and June, 1899, and it was decided that no meeting of the Society should be held on the third Wednesday of June, 1899.

May 10 a Junior meeting was held, Mr. J. M. Evans, Jun. Am. Soc. C. E., in the chair and 22 Juniors present. The subject for the evening was "Surveying in Connection with City Work." June 14 there will be a meeting of the Juniors for informal discussion of a subject to be named.

June 7 a regular meeting of the Society will be held at which a paper by Mr. George W. Rafter, M. Am. Soc. C. E., on "The Theory of Concrete," will be presented for discussion. This paper was printed in the April number of the Proceedings.

The May number of the Proceedings contains a paper by Mr. Charles H. Haskell, M. Am. Soc. C. E., on "Pile Driving Formulas; Their Construction and Factors of Safety." This paper will be presented Sept. 6. The May issue also contains a paper by Mr. Leonard Metcalf, Asso. M. Am. Soc. C. E., on "The Groined Arch."

PERSONAL

(For other personal mention see Elections and Appointments.)

—Mr. William Bowden Lyons, who was Superintendent of the Missouri, Kansas & Texas RR., at Sedalia, Mo., died at Canon City, Col. Mr. Lyons was born at New Albany, Ind.

—Mr. Robert Bloomsburg, Superintendent of the Pennsylvania Railroad Company's ferries at Jersey City, died at Bordentown, N. J., May 26. Mr. Bloomsburg was born in Philadelphia in 1829.

—Mr. Thomas Fildes, who resigned as Master Car Builder of the Lake Shore & Michigan Southern, at Chicago, as noted May 5, under "Elections and Appointments," became on June 1 Assistant Superintendent of Motive Power of the Long Island Railroad.

—Mr. Frank Nelson Winne, Manager of the Railroad Department of the Crane Co., of Chicago, died at his home in Evanston, Ill., May 29. Mr. Winne was born in 1858 and had lived in Evanston for 30 years. For 15 years he had been associated with the Crane Co.

—Mr. William Barclay Parsons arrived this week in San Francisco on his return from China. He has completed the survey of the line for a railroad from Hankow to Canton, and according to the newspaper dispatches "he favors the completion of the proposed work."

—Mr. C. W. Bradley, until recently General Superintendent of the West Shore and Second Vice-President of the American Railway Association, has been appointed Manager of the Western New York Car Service Association, with headquarters at Buffalo, N. Y., succeeding Mr. W. W. Halsey, resigned.

—Mr. W. H. Van Dervoort has resigned his position as Assistant Professor of Mechanical Engineering, University of Illinois, to take effect at the end of the college year, and will become one of the partners of the Root & Van Dervoort Engineering Co., in the manufacture of locomotive exhaust nozzles at Champaign, Ill.

—Mr. William Oden Hughart, who in 1893 was President of the Grand Rapids & Indiana RR., died at Grand Rapids, Mich., May 30. Mr. Hughart was born at Paris, Ky., in 1826, and entered the railroad service in 1858. He was for four years Secretary and Treasurer of the Pittsburgh & Connellsville, and for eight years its President.

—Mr. Fleming Gardner, Chief Engineer of the Atlantic Coast Line, died at Denmark, S. C., May 27. Although 83 years of age Mr. Gardner was actively at work up to the day before his death, superintending the survey and construction of a branch road of the A. C. L. Mr. Gardner served in the Mexican and Civil Wars, and was a native of Virginia.

—Col. E. W. Cole, of Nashville, Tenn., who was for many years connected with the coal and iron industries of the South, died at the Fifth Avenue Hotel, New York, May 24, aged 67 years. Col. Cole was born in Giles County, in 1832, and was at one time President of the East Tennessee, Virginia & Georgia RR.; he also held responsible positions on the Nashville, Chattanooga & St. Louis RR. During the Civil War he was made Colonel in the Quartermaster's Department, C. S. A., to facilitate the use of the N., C. & S. L. RR.'s property for moving the confederate troops and supplies.

ELECTIONS AND APPOINTMENTS.

Alberta Railway & Coal Co.—W. D. Barclay, Manager, with headquarters at Lethbridge, Alberta, has resigned.

Atlantic, Valdosta & Western.—E. P. Bacon, heretofore Cashier of the Jacksonville, Tampa & Key West, has been appointed Purchasing Agent of the A. V. & W., with headquarters at Jacksonville, Fla.

Baltimore & Ohio.—U. B. Williams, Trainmaster at Cumberland, Md., has been transferred to Grafton, W. Va., succeeding E. A. Peck, who has been transferred to Garrett, Ind.

Barre Branch.—At the annual meeting of the stockholders held at Montpelier, Vt., May 25, J. G. Farwell was elected Vice-President.

Burlington, Cedar Rapids & Northern.—At the annual meeting of the stockholders, held in Cedar Rapids, May 23, William Corson of Burlington, Ia., was elected a Director.

Central Vermont.—This railroad has been divided into two divisions, the Northern and Southern. F. W. Baldwin, heretofore General Superintendent, has been appointed Superintendent of the Northern Division, with headquarters at St. Albans, Vt. D. Mackenzie, heretofore Superintendent of the New London Division, has been appointed Superintendent of the Southern Division, with headquarters at New London, Conn. The office of General Superintendent has been abolished.

Chicago, Lake Shore & Eastern.—See Elgin, Joliet & Eastern.

Chicago, Rock Island & Pacific.—W. S. Tinsman has been appointed Trainmaster of the Chicago Division, succeeding J. G. Sickles, resigned.

Columbus, Lima, & Milwaukee.—J. Q. Marshall has been appointed Superintendent; P. M. Maple, Assistant Superintendent, and Andrew Bruon Traffic Manager.

Delaware, Lackawanna & Western.—Wm. H. Whalen has been appointed Purchasing Agent, with headquarters at Orange, N. J., succeeding W. D. Hager, resigned. J. G. Sickles has been appointed Division Superintendent.

Elgin, Joliet & Eastern.—J. Horrigan, heretofore Master Mechanic, has been appointed Superintendent of Motive Power of the E. J. & E., and also of the Chicago, Lake Shore & Eastern, succeeding C. J. Clifford, resigned.

Iowa Central.—J. N. Tittemore, General Freight Agent at Marshalltown, Ia., has been appointed Acting General Manager, owing to the illness of L. M. Martin, General Manager.

Kansas City, Pittsburg & Gulf.—R. J. McCarty has been appointed Auditor for the Receivers of this company, with headquarters at Kansas City, Mo.

Lehigh Valley.—We are officially informed that L. H. Knapp has been appointed Master Mechanic of the Buffalo Division. Effective June 1.

Long Island.—Thomas Fildes, formerly Master Car Builder of the Lake Shore & Michigan Southern, has been appointed Assistant Superintendent of Motive Power of the L. I. Effective June 1.

Mobile & Ohio.—This railroad will hereafter be operated as three Divisions, namely: The Mobile Division, extending from Mobile to Okolona, and from Artesia to Montgomery, including all branches; the Jackson Division, extending from Okolona to Cairo, and the St. Louis Division, extending from Cairo to East St. Louis, including branches. The Division Superintendents were given last week under Elections and Appointments, p. 378. Charles M. Shepard has been appointed General Passenger Agent, with headquarters at Mobile, Ala., succeeding E. E. Posey, resigned. R. H. Duesberry has been appointed Acting Purchasing Agent, with headquarters at Mobile, Ala., succeeding Geo. W. Stevens, resigned. The office of Chief Engineer has been abolished.

Omaha, Kansas City & Eastern.—We are officially informed that W. D. Tucker has been appointed Auditor and Assistant Treasurer, succeeding H. B. Johnson, transferred. E. M. Collins, heretofore Assistant Chief Engineer, has been appointed Chief Engineer, with headquarters at Quincy, Ill. E. H. Shaufler having resigned, the office of Assistant to the General Manager is abolished.

Pacific & Idaho Northern.—P. P. Shelby has been elected Vice-President and General Manager of this company, which is now building. (RR. Construction column, May 26, p. 379.)

Rumford Falls & Rangeley Lakes.—Waldo Pettengill, Vice-President of the Portland & Rumford Falls, has been appointed General Manager of the R. F. & R. L., and R. C. Bradford, Treasurer and Traffic Manager of the P. & R. F., has been elected Treasurer and Clerk of the R. F. & R. L.

St. Joseph & Grand Island.—J. G. Drew, Auditor and Cashier, with headquarters at St. Joseph, Mo., has resigned.

St. Louis & New Orleans.—The officers of this company, referred to in the Construction column, are: President, Reid Northrup, St. Louis, Mo.; Vice-President, T. Marshall Miller, New Orleans; Secretary and Treasurer, S. P. Vickory, St. Louis. Samuel P. Vikroy, St. Louis; Henry A. Garrett, Directors: W. A. Percy, Memphis, Tenn.; Reid Northrop, Frederick A. Gardner, Edward A. Faust, St. Joseph, La.; Joseph E. Ransdell, Lake Providence, La.; T. Marshall Miller, Charles J. Lewis, Herman G. Barrow, New Orleans; Murray F. Smith, Vicksburg, Miss.

St. Louis Southwestern.—C. J. Moore has been appointed Assistant Superintendent of Bridges and Buildings, with headquarters at Pine Bluff, Ark., succeeding T. E. Jarrett, resigned.

Southern Missouri & Arkansas.—The officers of this newly incorporated company (R. R. News column, May 12, p. 345) are as follows: President, Newman Erb; Vice-President, Edward Hidden; Treasurer and Assistant Secretary, Costello Lippitt; Auditor and General Freight and Passenger Agent, E. F. Blomeyer, and Superintendent, E. W. Cover.

Wheeling & Lake Erie.—H. J. Booth has been elected General Traffic Manager of the W. & L. E., which was recently incorporated as successor to the old company. (See General Railroad News Column, May 5, p. 326.)

RAILROAD CONSTRUCTION,
New Incorporations, Surveys, Etc.

BALTIMORE & LEHIGH.—Engineers are reported seeking an available route for an extension of this line northeast to the Lancaster & Reading in Pennsylvania.

BOSTON & MAINE.—The stockholders of the Concord & Montreal on May 24 voted to build the proposed Manchester & Midland extension from Manchester, N. H., southwest about 10 miles to Milford. Surveyors will be placed on the line June 10, and grading will be begun as soon as their work is finished. (Feb. 24, p. 145.)

CALUMET WESTERN.—The ordinance introduced into the Chicago City Council in 1897, granting this company right of way in South Chicago, was placed on file May 26. This is to be a terminal road built jointly by the Pennsylvania Co., the Michigan Central and the Chicago, Rock Island & Pacific. (Oct. 28, 1898, p. 785.)

CANADIAN PACIFIC.—W. P. Tierney & Co., of Nelson, B. C., have the contract for straightening the Columbia & Kootenay line between Nelson and Robson. There will be a number of solid rock cuts required.

CHESAPEAKE & OHIO.—Negotiations are being made, according to report, for an extension from Gordonsville, Md., northwest about 30 miles to Elkton, on the Norfolk & Western.

CHESAPEAKE BEACH.—Rails are reported laid as far as Calvert County on this line from Washington, D. C., east 30 miles, via Marlborough, to Chesapeake Beach, Md. Otto Mears of Washington, D. C., is President and General Manager. (April 7, p. 252.)

CHICAGO & NORTHWESTERN.—Reports from Iowa state that this company has decided to build a branch from Reubens, on the main line of the Northern Iowa Division, to run southwest about eight miles to Pocohontas, county seat of Pocahontas County, Ia. Pocahontas is said to be the only county seat in Iowa without a railroad.

CHICAGO, INDIANA & EASTERN.—Track is laid within six miles of Converse, Ind., and the company expects to have the line completed to that city within 30 days. The rails were laid to Swayzee late last fall. H. E. Drew of Fairmont is General Manager. (March 17, p. 196.)

CHICAGO, KALAMAZOO & SAGINAW.—Terminal facilities are being improved at Kalamazoo, Mich., according to report, including the building of freight warehouses and the addition of much siding.

COLORADO & SOUTHERN.—An official writes with reference to the work at Trinidad, Col., that there are to be two or three short spurs, the longest about 9,000 ft. They are merely switches which will be built from old rail. He further states that the company has made no arrangements to build through Stonewall Valley and Ponil Park. (May 19, p. 359.)

COOK LAKE & McHENRY COUNTIES RAILWAY.—This company has been organized in Illinois to build a railroad through the counties named in the title. The route, so far as stated, is from Nippersink Point on Fox Lake, to run east to Hainesville on the Wabash, and thence southeast to Libertyville on the Chicago, Milwaukee & St. Paul. Leslie Carter, of Chicago, is President, and J. B. Walter, Vice-President. Right of way is being secured and the company expects to begin building within a few weeks.

DOLAN CITY & DAWSON.—This company has been organized at Louisville, Ky., to build a railroad from a point on the Copper River in Alaska, to be known as Dolan City, to run north to Dawson City, N. W. T. D. J. Mackey, of Louisville, is President, and Paul F. Semoin, of Louisville, and H. P. Dolan, of Endfield, Ill., are interested.

EAST TENNESSEE LUMBER & MINING.—Surveys are completed for this narrow gage road from Newport, Tenn., south 17 miles. The work will be moderately difficult. It will require about one mile of trestle. R. C. Smith is President and W. F. Mosher Chief Engineer, both of Newport, Tenn. (Official.) Earlier reference to this project was made under Tennessee Roads (May 19, p. 360).

FLINT & PERE MARQUETTE.—The Sand Beach Division, extending from Port Huron, Mich., to Sand Beach, 70.18 miles, will, according to report, be converted into a standard gage line in the very near future, and the company is making active preparations for the change.

GRAND RAPIDS, BELDING & SAGINAW.—The State Board has approved of the map for the extensions of the Lowell & Hastings line in Ionia and Kent counties. (L. & H., May 5, p. 323. See also R. R. News column, this issue.)

GREAT NORTHERN.—Officials of this company are reported making preliminary surveys for an extension of the Duluth, Mississippi River & Northern from Hibbing, Minn., east 20 miles to Virginia. An agreement has been made with the American Steel & Wire Co., which controls mines in that region.

GREENWICH & JOHNSONVILLE.—This line, which runs from Johnsonville, N. Y., on the Fitchburg, north 14.65 miles to Greenwich, will be extended north three or four miles further to Middle Falls.

GULF, BEAUMONT & KANSAS CITY.—Locating surveys are being made in the vicinity of Center, Tex., for the proposed extension from the point already completed, 10 miles above Kirbyville, to run north about 60 miles to Jefferson. (March 10, p. 179.)

ILLINOIS CENTRAL.—Track laying was begun last week on the Fort Dodge & Omaha extension from Tara, Ia., near Fort Dodge, to run west 130 miles to Council Bluffs. (March 31, p. 235.)

INVERNESS & RICHMOND.—D. D. Mann, of Mackenzie & Mann, railroad contractors, has signed a contract with the Nova Scotia Government to build at once this line from Port Hastings, N. S., to Broad Cove, 57 miles. This line will be the first to draw the increased subsidy of $4,000 per mile granted by the Provincial Legislature at its last session, and will also get $3,200 from the Federal Government and $1,000 per mile from the counties of Inverness and Richmond, together with free right of way. The line runs through rich coal fields. The road is already graded 15 miles out from Port Hastings. Engineers are on the ground and they want 500 men and all the teams they can get. It is proposed to extend the line still further to Cheticamp, about 100 miles. Peter Ryan, of Toronto, Ont., is among those interested. (May 12, p. 343.)

IOWA, MINNESOTA & NORTHWESTERN.—The citizens of Parkersburg, Ia., have voted a 5% tax in aid of this company, provided the road is completed and in operation by Jan. 1, 1900, and the depot is erected within 600 ft. of that of the Illinois Central. The road, as projected, is to run from Belle Plaine, Ia., northwest via Parkersburg, Beaumont and Mason City, Ia., to Blue Earth, Minn., connecting two sections of the Chicago & Northwestern, which is supposed to back the project. (Jan 13, p. 33.)

KANSAS CITY, PITTSBURGH & GULF.—The cut-off from Trimble, Mo., north 10¼ miles to Gower, recently completed, has been turned over to the St. Joseph & Grand Island. (Feb. 17 p. 131.)

LOUISVILLE & NASHVILLE.—Surveyors are reported in the vicinity of Aiken, S. C., making surveys for an extension of the Georgia line from Augusta, Ga., southeast about 125 miles to Charleston.

LUCKIAMUTE VALLEY & WESTERN.—The General Manager is reported as stating that arrangements are about completed for the rails and rolling stock for this line from Falls City, Ore., to Salem, 22 miles. It is expected to have the grading completed into Dallas in a very short time. J. S. Talbot, of Fall City, is President and General Manager, and A. L. Porter, Chief Engineer. (April 14, p. 271.)

MARBLEHEAD, PORT CLINTON & SOUTHERN.—This company has been organized in Ohio to build a railroad from Marblehead, on Lake Erie, to run south to Port Clinton and Fremont. Wm. L. Allendorf, Secretary of the Ohlemacher Lime Co., of Sandusky, O., is interested.

MEMPHIS & ST. LOUIS.—This company was incorporated in Missouri, May 20, with a capital stock of $200,000, to build a railroad from New Madrid, south about 20 miles to a point in Pemiscot County. Among the incorporators are: S. S., W. A. and Charles M. Barnes.

MILWAUKEE TRAFFIC & TERMINAL.—An ordinance has been introduced into the City Council at Milwaukee, Wis., granting a franchise to this company to build a belt line around the city from North Milwaukee to the town of Lake on the south, with a spur from that point south to connect at Waukegan with an extension of the Chicago Belt Line. It is stated that the company has $3,000,000 capital, and that it will complete the project within two years.

MISSOURI, KANSAS & TEXAS.—An official is reported as saying that work is to begin at once on the two extensions of the Sherman, Shreveport & Southern, from Jefferson, Tex., to Shreveport, La., and from San Marcos to San Antonio, Tex. (May 19, p. 360.)

MOBILE & OHIO.—Grading is to be begun soon, according to report, on an extension of this line from Columbus, Miss., northwest via Aberdeen and Okalona to Memphis, Tenn.

MOSCOW & EASTERN.—Final surveys were begun May 16 on this proposed line from Moscow, Id., east 35 miles to Collins. About a month will be required to complete the surveys, after which, according to the report, cross-sectioning will be begun on the Moscow end and contract for grading let at once. George Creighton of Moscow is President. (May 19, p. 360.)

NIPISSING & JAMES BAY.—The charter of this company has been revived and one year given to commence work, and two years to finish the section to Lake Nemogaming, the entire road to be completed in five years.

NORTHERN PACIFIC.—The Council of Portage la Prairie, Man., has granted a 33-ft. right of way for an extension through that town westward to the Thistle District. It is stated that Mackenzie & Mann are trying to induce the N. P. to sell this branch. (May 5, p. 324.)

OREGON RAILROAD & NAVIGATION.—Track laying will be begun probably early in July and finished in September on the Snake River Valley line from Wallula, Wash., east 65.7 miles along the south side of Snake River to Grange City. There are 2,000 men and 400 teams at work. The maximum grades westward are 16 ft. and eastward 26 ft. per mile. The maximum curves are 6°. There will be three tunnels, 1,000 ft., 580 ft. and 450 ft. long respectively. The line will be laid with 75-lb. rail, much of which is already delivered by the Illinois Steel Co. (March 31, p. 236.) Coykendall & Shields, of Wallula, Wash., are Superintendents of Construction, and subcontracts are let for the entire distance. (Official.)

OTTUMWA & NORTHERN.—The people of Ottumwa, Ia., have voted a 1½% tax to aid this railroad in building its line through that city to connect with the Iowa Central at Wright, Ia. Twenty-three miles will be built this year. Thomas D. Foster, of Ottumwa, Ia., is President. (Feb. 17, p. 132.)

PITTSBURGH & WESTERN.—Drake & Stratton of Philadelphia have the contract, according to report, for extensive improvements on six miles of this line between Ellwood City, Pa., and Moravia. These will include a reduction of grade, the replacing of two wooden trestles with stone and the building of a culvert 240 ft. long.

RANDSBURG.—Owners of mines in the Ballarat and Darwin fields, Cal., have made offers to this company to extend this line north 65 miles.

ST. ANTHONY.—This company has been incorporated in Idaho, with a capital stock of $500,000, to build 39 miles of railroad from Idaho Falls northeast to St. Anthony, on the Snake River. Among the directors are. E. E. Calvin (President), F. W. Hills and A. J. Van Kuran, all of Salt Lake City, and officials of the Oregon Short Line, which is back of the project. (O. S. L., May 19, p. 360.)

ST. LOUIS & NEW ORLEANS.—This company was organized at New Orleans, La., May 22, with a capital stock of $5,000,000, to build a railroad from that city north along the west side of the Mississippi River to Memphis, Tenn. The officers are given under Elections and Appointments.

ST. LOUIS & NORTHERN SHORT LINE.—In the transfer of this property (noted in the News column this week), the extension to Chicago and probably that to Clinton are abandoned. (April 14, p. 272.)

ST. LOUIS, IOWA & NORTHERN.—The stockholders have voted to issue the $3,000,000 first mortgage bonds to build this line from Eldon, Ia., south 274 miles through the states of Iowa and Missouri to St. Louis. Surveys are completed for the entire distance. It is reported that the Chicago, Rock Island & Pacific is back of the project. S. H. Sawyers is President, and J. E. Houghland, General Superintendent, both of Eldon, Ia. (April 14, p. 272.)

SAN PETE VALLEY.—Track laying is reported begun on the extension of the branch from the main line at Salt Springs, Utah, north three miles to Nebo

Salt Works, and thence west 3¼ miles to Nebo. (May 12, p. 343.)

SANTA FE, PRESCOTT & PHOENIX.—The General Manager writes with reference to the proposed extension of the line to Tempe and Mesa, that examinations have been made of the country between Phoenix, Ariz., and these places, but that the company has no definite plans looking to an extension. (Dec. 2, 1896, p. 868.)

SOUTH SHORE (Canada).—The Canadian Government has granted a subsidy of $6,400 per mile for the proposed extension of this line from Sorel northeast along the St. Lawrence about 150 miles to Levis. The line now runs from Montreal to Sorel.

TECUMSEH & SHAWNEE.—This company was incorporated in Oklahoma Territory May 21, with a capital stock of $15,000, to build a railroad in Pottawatomie County from Tecumseh north six miles to Shawnee on the Choctaw, Oklahoma & Gulf line. The Directors are: W. Christian, J. W. Mayle, J. F. Rush, J. W. Saxon and W. R. Asher, of Tecumseh, and C. M. Cade, of Shawnee.

TENNESSEE CENTRAL.—Rails are reported to have arrived for the first section of the extension of this line now building from Harriman, Tenn., to Clarksville. It is stated that track will be laid to the top of the mountain as soon as the tunnel is completed, which will be within 30 days. (Feb. 17, p. 122.)

TENNESSEE VALLEY.—This company has been incorporated in Tennessee to build a railroad from Harriman, to run south about 75 miles through Roane, Loudon, McMinn and Monroe counties, Tenn., to Murphy, N. C., on the Southern Ry., or to the Georgia line, with several branch lines.

TEXAS & PACIFIC.—An extension is under consideration, according to report, from Denison, Tex., northeast about 120 miles to McAlester, Ind. Ter., paralleling the Missouri, Kansas & Texas.

THUNDER BAY, NEPIGON & ST. JOSEPH.—An act incorporating this company has just been passed. The line will run from Port Arthur, Ont., via Dog Lake and Nepigon to Albany River. Debenture stock, payable in 21 years at 5%, may be issued, not to exceed $3,000 per mile actually completed or building, and 20% of the gross earnings is to be reserved to pay the debenture interest. D. F. Burk, of Port Arthur, is General Manager. (Feb. 3, p. 93.)

WEST VIRGINIA SHORT LINE.—The Mountain State Construction Co. of West Virginia, on May 26, let to Gooch, Rinehart & Dennis of Richmond, Va., the contract for building this line from Clarksburg, W. Va., west 60 miles by way of the Ten-mile Fork of the West Fork of the Monongahela River and Fishing Creek to New Martinsville, W. Va., on the Ohio River RR. The line will develop oil and coal fields in Harrison and Wetzel counties. The work is heavy, involving 2,000,000 yds. of excavation, a number of bridges and one mile of tunnels through the Divide. (May 19, p. 360.) George A. Burt of Parkersburg, W. Va., Vice-President and General Manager of the Ohio River, is President, and J. V. Davies, 32 Nassau St., New York, Chief Engineer. (Official.)

WISCONSIN, MICHIGAN & NORTHERN (successor to the Wisconsin & Michigan).—Grading was resumed last week on the proposed extension from Faithorn Junction, Mich., north 16 miles via Vulcan and Norway to Quinnesec. Several miles of grading was done last season. (March 17, p. 198.)

GENERAL RAILROAD NEWS.

BALTIMORE & OHIO.—The Special Masters give notice that under the decree of the United States Circuit Court, District of Maryland, entered May 15, holders of various bonds and coupons are to present same for payment on or before June 17, at the office of the receivers, Baltimore, after which date interest will cease.

In the Superior Court at Baltimore, on May 22, the company filed its first mortgage for $165,000,000 to the United States Trust Co., New York, as trustee, to secure 4% gold bonds, dated July 1, 1898, payable July 1, 1948, in denominations of $1,000 and $500 each, with interest payable Oct. 1, and April 1 of each year; also its prior lien mortgage for $75,000,000 to the Mercantile Trust Co., as trustee, to secure 3½% gold bonds, due 1925. (May 26, p. 380.)

The voting trustees give notice to holders of trust certificates for the preferred and common stock, that a meeting will be held at No. 2 Wall St., New York City, June 26, at 12 o'clock noon, to vote on the proposition to increase the preferred stock by the addition of $20,000,000, and to increase the common stock by $10,000,000, to carry out the plan for the reorganization of the Baltimore & Ohio Southwestern.

BALTIMORE & OHIO SOUTHWESTERN.—Judge Thompson, in the United States Circuit Court, at Cincinnati, O., May 27, issued an order for the sale of this property, now in the hands of receivers, to be held at Cincinnati, the upset price being $3,500,000. The decree is by consent of all parties interested. It is probable that the property will be bid in by the Baltimore & Ohio, which has taken steps to absorb the line. (Feb. 24, p. 147.)

BIRMINGHAM SOUTHERN.—A transfer of the railroad property of the Tennessee Coal & Iron Co., under the above title, was made on May 26 to the Louisville & Nashville and the Southern. The price is $1,100,000, to be paid July 1. (April 28, p. 307.)

CHICAGO & WEST MICHIGAN.—The company will pay interest in full on the coupons due June 1 of the 5% bonds. Interest was paid in full last December, but a year ago $20 was paid in cash and $5 in 10-year coupon scrip. (Nov. 25, 1898, p. 854.)

CHICAGO GREAT WESTERN.—Instruments releasing the mortgages on property of this company were filed in the office of the County Auditor of Polk County, May 25. This releases the last of the mortgages on the C. G. W., making it the largest railroad in the United States without mortgage or bonded debt. (April 14, p. 273.)

COLUMBUS, SANDUSKY & HOCKING.—Judge Smalley, at Bucyrus, O., May 25, appointed Nicholas Monsarrat, President of the Hocking Valley, as receiver of the C., S. & H., to succeed S. M. Felton, who was deposed recently by the decision of the same judge, taking the property out of his hands. (May 26, p. 380.)

EASTERN RAILROAD IN NEW HAMPSHIRE.—At a special meeting of the stockholders of the Boston & Maine, held in Lawrence, Mass., May 24, the proposed purchase of the E. RR. in N. H. was approved. (April 28, p. 307.)

FLINT & PERE MARQUETTE.—A plan dated May 20, 1899, has been approved by the directors of the F. & P. M. (653.03 miles), the Detroit, Grand Rapids & Western (581.11 miles), and the Chicago & West Michigan (451 miles), for the union and readjustment of the capitalization of these companies. The present capitalization is as follows:

	Funded Debt.*	Equipment Obligations.	Preferred Stock.	Common Stock.
F. & P. M. Co.	$11,324,000	$160,000	$6,342,000	$3,298,200
D., G. R. & W. Co.	5,379,000	.....	3,183,500	2,510,000
C. & W. M. Co.	8,108,465	373,000	.....	7,512,800
Totals	$24,811,465	$533,000	$9,525,500	$13,321,000

*Including underlying bonds of controlled companies.

Under the consolidation there is to be $16,000,000 common stock and $12,000,000 4% non-cumulative preferred stock. Of the new common stock $125 is to be issued for each $100 of the old stock of the F. & P. M., and par value for the D., G. R. & W. and the C. & W. M. common stock. This will require $14,145,550, leaving $1,854,450 in the treasury for future requirements. Of the new preferred stock, par value is to be issued for the old preferred stock of the F. & P. M.; and $120 for each $100 share of the D., G. R. & W. old preferred stock. This will leave $1,837,800 in the treasury for future requirements. This agreement is issued under the following committee: Wm. W. Crapo (Chairman), John M. Graham, Charles M. Heald, Charles Merriman, Oliver W. Mink, Thomas F. Ryan and Nathaniel Thayer. The consolidated company is to be formed either by the increase of the capital stock of one of the existing companies, or by the organization of a new company to lease or buy the property of the old companies, as the committee may determine.

The Safe Trust Co. of New York is the depositary of the stock of the F. & P. M., and the Old Colony Trust Co. of the other companies. Stockholders of any of the companies may become parties to the agreement by depositing their stock certificates on or before June 20, after which date deposits will be received only subject to such terms as the committee may from time to time impose. The plan is to be declared operative when a majority of the stock of each of the three companies is deposited. The consolidation will include 1,687.14 miles of road.

GRAND RAPIDS, BELDING & SAGINAW.—This company, which was incorporated in Michigan last November to build the extensions of the Lowell & Hastings, has made a mortgage for $260,000 to the International Trust Co., of Boston, as trustees. (Nov. 25, 1898, p. 852.)

LAWRENCEVILLE & EMPORIA.—Judge Hook in the United States Circuit Court at Topeka, Kan., May 23, ordered the foreclosure sale of this road, which runs from Lawrence, Kan., to Emporia. It went into the hands of the receiver with the Union Pacific, March 13, 1893. The line was abandoned in 1894 and consists only of the right of way and a few rails. Hiram Dillon is named as Special Master for the sale. (Oct. 7, 1898, p. 733.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The $3,500,000 second mortgage 4% 50-year gold bonds, offered for sale at £196 for every $1,000 bond, are part of the total issue of $5,000,000. The remaining $1,500,000 will be delivered by the Canadian Pacific from time to time, in such amounts as the C. P. R. may approve in writing. The agreement between the two companies provides that the proceeds of the bonds shall be applied for terminal yards and facilities at Minneapolis; for permanent bridges and improvements; for new rolling stock equipment, and for retiring outstanding liabilities and floating debts. (May 26, p. 380.)

PHILADELPHIA, READING & NEW ENGLAND.—The final installment of 25% of the assessments upon A and B income bonds, and preferred and common stock, under the reorganization plan, is called for payment on or before June 8, at the Fidelity Insurance, Trust & Safe Deposit Co., Philadelphia. (April 28, p. 308.)

ST. LOUIS, IRON & SOUTHERN.—The stockholders, on June 26, will vote to increase the capital stock by $40,000,000, and the bonded indebtedness by a like amount. The bonded indebtedness is for retiring the 5% gold funding notes and the Iron Mountain car trust certificates, and for acquiring the second mortgage bonds of the Texas & Pacific. (March 31, p. 238.)

ST. LOUIS & NORTHERN SHORT LINE.—The trustees have issued a circular to the subscribers of the bonds and stock of this road announcing that an agreement has been made to turn over this property to a syndicate composed of E. H. Harriman, Jacob H. Schiff, James Stillman and George J. Gould. The terms are substantially as follows: The capital stock of the Laclede Construction Co. is to be exchanged at par for Chicago & Alton purchase money certificates. The certificates of subscription to the securities of the St. L. & N. S. L., on each of which $3,200 has been paid, is to be taken at par in purchase money certificates of the C. & A., under its syndicate agreement of March 2 last. Payments of cash and deliveries of C. & A. purchase money certificates will be made on the delivery of the certificates of Laclede Construction stock and St. L. & N. S. L. subscription certificates to Kuhn, Loeb & Co., New York, on or before June 5, who will issue scrip for fractional securities. After that date, and until June 20, cash only will be paid to the extent of $100 for each share of Construction Company stock and $3,270 for each certificate of Short Line securities. It is stated that a majority of the securities of the two companies have accepted the above terms, and that the control of the railroad has been turned over to the syndicate.

ST. LOUIS SOUTHWESTERN.—The Governor of Texas has signed the bill authorizing the Texas Company to buy the Tuyler Southeastern, which is already operated as a part of the system. A previous bill for the same purpose was vetoed. (March 31, p. 238.)

SIOUX CITY, O'NEILL & WESTERN.—This property was sold at public auction at Sioux City, Ia., May 26, to J. L. Webster of Omoha, Neb., representing the reorganization committee, for $1,750,000. This line runs from Covington, Neb., to O'Neill, 129.16 miles. It went into the hands of a receiver in January, 1895. (April 14, p. 274.)

WHEELING & LAKE ERIE.—A meeting of the stockholders will be held June 26, to approve the purchase of the Cleveland, Canton & Southern and the Cleveland Belt & Terminal, and to authorize a mortgage of $15,000,000 4% bonds to cover the combined properties. These will be used as follows: To retire present first mortgage 5's, $6,400,000; to retire equipment trust and buy new equipment, $1,200,000; for the two new railroad companies, $4,000,000; for extensions and improvements, $1,400,000, leaving $2,000,000 in reserve. The new acquisitions give the W. & L. E. entrance into Cleveland, with important terminal facilities. The directors have approved of the expenditure of $1,000,000 for improvements during the year. (May 19, p. 362.)

WISCONSIN CENTRAL.—The United States Circuit Court at Milwaukee, Wis., on May 30 decreed the foreclosure sale of this property, under consent of all interests involved. This probably clears the way for the complete reorganization of the company. (May 26, p. 380.)

TRAFFIC.

Traffic Notes.

Reports from Buffalo say that the harbor is now cleared of the vessels loaded with grain, which accumulated during the recent strike, and that business is again in normal condition. On May 25, the second day after the men returned to work, the quantity of grain elevated was 1,405,923 bushels.

The Delaware, Lackawanna & Western announces the establishment of a complete equipment of cabs and carriages for the accommodation of passengers going to and from the Christopher street station of the company in New York City. The new service will be run by the Westcott Express Co. The city (Manhattan Borough) has been divided into zones and a circular issued containing a map which shows the boundaries of the different districts. In the first district, embracing distances of one to 1½ miles from the ferry, a hansom or a four-wheel cab costs 75 cents; and a carriage, with room for four persons, $1.25. Handbags carried on the outside of a carriage will be charged 10 cents and small trunks 20 cents.

The suit of the Southern Pacific Railroad against the California State Railroad Commission concerning the grain rate order issued by the commissioners about two years ago has finally been dismissed by the United States Circuit Court at San Francisco. The original order directed the railroad company to make a general reduction of 25 per cent. in the rates for the transportation of grain throughout the State. The railroad company at once began proceedings in the courts to contest the legality of the order, and the litigation was kept up until a new Board of Railroad Commissioners came into office, a few months ago. The new commissioners at once let it be known that they should make no active efforts to secure the enforcement of the order.

Interstate Commerce Commission.

The hearing on export and domestic rates will be continued at Chicago June 12 and St. Louis June 15. The notice of hearing states that it is proposed to secure evidence at these hearings showing all important changes which have taken place in rates to the Atlantic and Gulf of Mexico ports on shipments of grain and grain products, and the reasons why such changes were made; and that the investigation will include the relation of rates on grain and grain products to the various ports, as well as the relation of rates on domestic and export shipments of grain and domestic and export shipments of grain products. The carriers are directed to have witnesses in attendance who are best qualified to testify with knowledge concerning this traffic and its history, and the rates and method of rate-making which have prevailed at different periods.

Chicago Traffic Matters.

Chicago, May 31, 1899.

General passenger agents of the roads in the Western Immigrant Clearing House have finished their arguing for the time being and adjourned their meeting for ten days. No settlement was reached.

The Southwestern Passenger Association has adopted the Sebastian Interchangeable mileage ticket.

The Chicago & Northwestern now has to meet active elevated road competition between Chicago and numerous suburban towns. The Lake Street Elevated has extended its line to Oak Park and made a five-cent fare from there in. The Northwestern has now announced that it will put on a number of additional trains between the city and Oak Park and Austin, the former being west of the latter, and run the same in and out in about 15 minutes, making no intermediate stops. The best time the elevated can make is something like 45 minutes. The Northwestern can make pretty fast time to these places, as its tracks are elevated for practically the entire distance.

Eastbound shipments from Chicago, as reported weekly by the Board of Trade, were, for the four weeks ending May 27, 363,121 tons, as compared with 391,239 tons for the corresponding period of last year. This total of 363,121 tons is made up of 29,866 tons of flour and mill stuffs, 200,400 tons of grain, 50,158 tons of provisions, 40,191 tons of dressed beef, and 42,506 tons of miscellaneous freight.

Eastbound shipments of flour, grain and provisions from Chicago and Chicago junctions to and beyond the western termini of the Trunk Lines for the four weeks ending May 27 amounted to 347,260 tons as compared with 378,252 tons for the corresponding period of last year. This statement includes 30,750 tons of flour, 257,575 tons of grain, 57,935 tons of provisions. The following table shows the quantities and proportions carried by the respective roads:

Baltimore & Ohio	40,697	11.1
Cleveland, Cincinnati, Chicago & St. Louis	15,049	4.2
Chicago & Erie	43,342	12.3
Grand Trunk	14,923	4.2
Lake Shore & Michigan Southern	62,791	18.
Michigan Central	29,540	8.5
New York, Chicago & St. Louis	29,442	8.4
Pittsburgh, Cincinnati, Chicago & St. Louis	29,702	8.5
Pittsburgh, Fort Wayne & Chicago	60,638	17.3
Wabash	21,156	6.8
	347,260	100.0